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FCC PART 15 SUBPART C TEST REPORT

FCC Part 15.247

Report Reference No.....:	**CTL11078411-S-WB**
Compiled by (position+printed name+signature)..:	File administrators Andy Zhang
Name of the organization performing the tests (position+printed name+signature)..:	Test Engineer Kendy Wang
Approved by (position+printed name+signature)..:	Manager Tracy Qi
Date of issue.....:	July 25, 2011
Representative Laboratory Name .:	**Shenzhen CTL Electromagnetic Technology Co., Ltd.**
Address.....:	Zone B，4/F, Block 20，Guangqian Industrial Park, Longzhu Road, Nanshan,Shenzhen 518055 China.
Test Firm.....:	**Bontek Compliance Testing Laboratory Ltd**
Address.....:	1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China
Applicant's name.....:	**Livall Network Co,.Ltd**
Address.....:	9/F, Jiuzhou Electric Building, Southern NO.,12 rd.Technology Park, Shenzhen
Test specification:	
Standard .....:	FCC Part 15.247: Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.
TRF Originator.....:	Shenzhen CTL Electromagnetic Technology Co., Ltd.
Master TRF.....:	Dated 2011-01

Test item description ..... :	MID
Trade Mark .....:	/
Model/Type reference.....:	N71
Modulation .....:	FHSS
Work Frequency Range……..:	2400~2483.5MHz
Antenna Type……:	Fixed (-1.45dBi)
FCC ID……..…..:	ZRD-N71
Result.....:	**Positive**

TEST REPORT

Test Report No. :	CTL11078411-S-WB	July 25, 2011 Date of issue

Equipment under Test	:	MID
Model /Type	:	N71
Listed Models	:	/
Applicant	:	Livall Network Co,.Ltd
Address	:	9/F, Jiuzhou Electric Building, Southern NO.,12 rd.Technology Park, Shenzhen
Manufacturer		Best System (HK) Limited
Address		Chiling Industrial Zone, Hou Jie Town, Dongguan City, Guangdong Province,

Test Result according to the standards on page 4:	**Positive**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1. TEST STANDARDS

The tests were performed according to following standards:

FCC Part 15.247: Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.

ANSI C63.4-2003

FCC Public Notice DA 00-705: Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems

2 . SUMMARY

2.1. General Remarks

Date of receipt of test sample : July 01, 2011

Testing commenced on : July 01, 2010

Testing concluded on : July 21, 2010

2.2. Equipment Under Test

Power supply system utilised

Power supply voltage : ● 120V / 60 Hz o 115V / 60Hz
o 12 V DC o 24 V DC
o Other (specified in blank below)

2.3. Short description of the Equipment under Test (EUT)

MID with Bluetooth and Wi-fi function.

For more details, refer to the user's manual of the EUT.

Serial number: Prototype

2.4. EUT operation mode

Test Mode:

1. The EUT has been tested under normal operating condition.
2. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.
Channel low (2402MHz), mid (2441MHz) and high (2480MHz) with highest data rate are chosen for full testing.

2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

o - supplied by the manufacturer

o - supplied by the lab

o Manufacturer :
Model No. :

o Manufacturer :
Model No. :

2.6. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **ZRD-N71** filing to comply with of the FCC Part 15.247 Rules.

2.7. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Bontek Compliance Testing Laboratory Ltd
1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2003) and CISPR Publication 22.

3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

IC Registration No.: 7631A

The 3m alternate test site of Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7631A on March, 2008.

FCC-Registration No.: 338263

Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 338263, March 24, 2008.

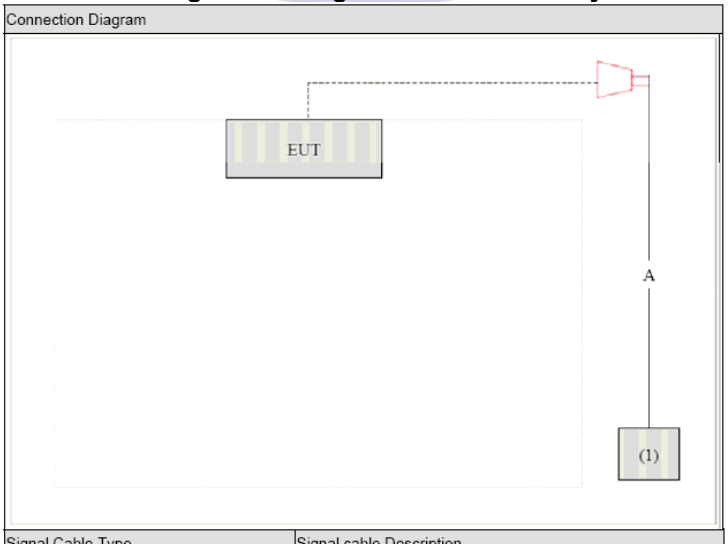
3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System



Signal Cable Type		Signal cable Description
A	Coaxial Cable	Shielded, >5m

3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Bontek Compliance Testing Laboratory Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Bontek laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	1~12.75GHz	4.32dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.6. Equipments Used during the Test

Item	Test Equipment	Manufacturer	Model No.	Last Cal.	Due. Date
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	2011/04/14	2012/04/13
2	Radio Communication Tester	ROHDE & SCHWARZ	CMU200	2011/04/14	2012/04/13
3	Dual Directional Coupler	Agilent	778D	2011/04/14	2012/04/13
4	10dB attenuator	SCHWARZBECK	MTAIMP-136	2011/04/14	2012/04/13
5	Tunable Bandreject filter	K&L	3TNF-800	2011/04/14	2012/04/13
6	Tunable Bandreject filter	K&L	5TNF-1700	2011/04/14	2012/04/13
7	High-Pass Filter	K&L	9SH10-2700/X12750-O/O	2011/04/14	2012/04/13
8	High-Pass Filter	K&L	41H10-1375/U12750-O/O	2011/04/14	2012/04/13
9	Coaxial Cable	Huber+Suhner	AC4-RF-H	2011/04/14	2012/04/13
10	AC Power Supply	IDRC	CF-500TP	2011/04/14	2012/04/13
11	DC Power Supply	IDRC	CD-035-020PR	2011/04/14	2012/04/13
12	RF Current Probe	FCC	F-33-4	2011/04/14	2012/04/13
13	Temperature /Humidity Meter	zhicheng	ZC1-2	2011/04/14	2012/04/13
14	MICROWAVE AMPLIFIER	HP	8349B	2011/04/14	2012/04/13
15	Amplifier	HP	8447D	2011/04/14	2012/04/13
16	SIGNAL GENERATOR	HP	8647A	2011/04/14	2012/04/13
17	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	2011/04/14	2012/04/13
18	Horn Antenna	Schwarzbeck	BBHA9120A	2011/04/14	2012/04/13
19	EMI Test Receiver	R&S	ESPI	2011/04/14	2012/04/13

3.7. Summary of Test Result

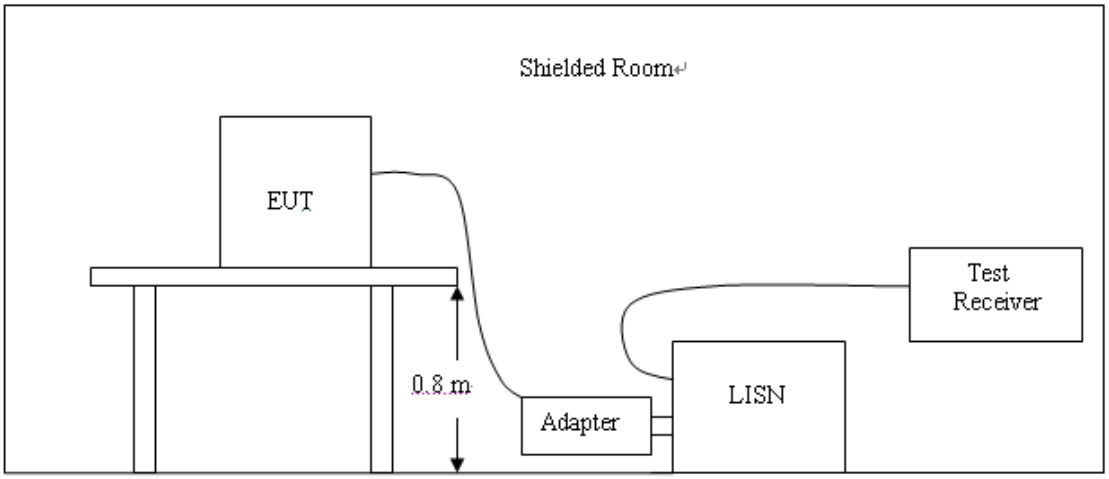
No deviations from the test standards

FCC Rules	Description Of Test	Result
§15.207(a)	Conducted Emission	Compliant
§15.247(b)(1)	Peak Output Power	Compliant
§15.247(a)	20dB Bandwidth	Compliant
§15.247(c)	100 KHz Bandwidth Of Frequency Band Edges	Compliant
§15.209(a) (f)	Spurious Emission	Compliant
§15.247(a)(1)	Frequency Separation	Compliant
§15.247(a)(1)(iii)	Number of hopping frequency	Compliant
§15.247(a)(1)(iii)	Time of Occupancy	Compliant
§15.203, §15.247(b)(4)(i)	Antenna Requirement	Compliant
§1.1310	RF Exposure	Compliant

4. TEST CONDITIONS AND RESULTS

4.1. Conducted Emissions Test

TEST CONFIGURATION



TEST PROCEDURE

For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following：

Frequency (MHz)	Maximum RF Line Voltage (dBμv)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

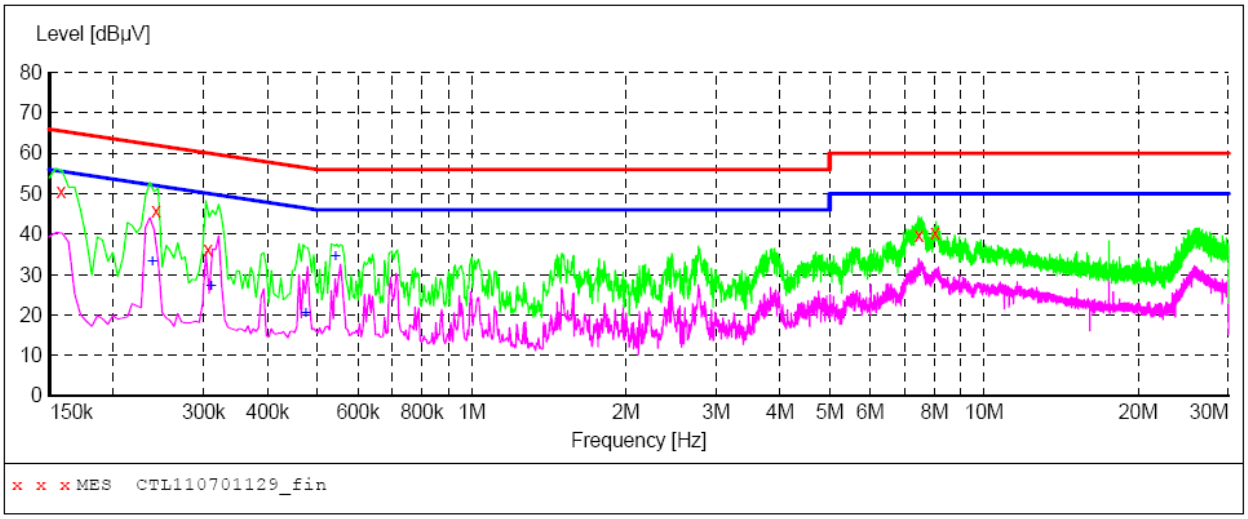
1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

The RBW/VBW for 150KHz to 30MHz: 9KHz

TEST RESULTS

See the following plots.

SCAN TABLE: "Voltage (9K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL110701129_fin"

7/1/2011 5:06PM

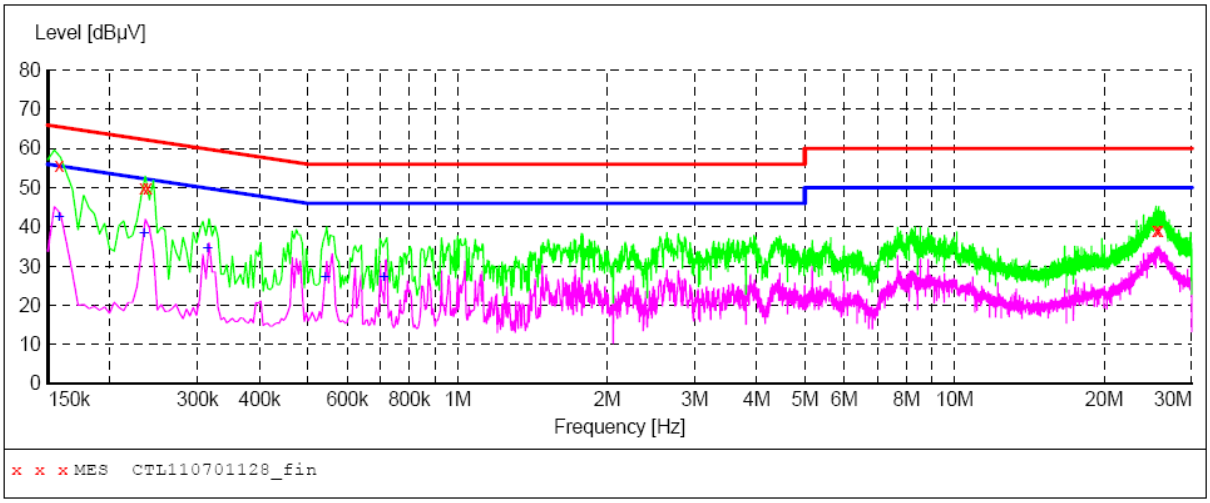
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.158000	50.50	10.2	66	15.1	QP	N	GND
0.242000	45.80	10.2	62	16.2	QP	N	GND
0.306000	36.20	10.2	60	23.9	QP	N	GND
7.472000	39.70	10.5	60	20.3	QP	N	GND
8.024000	40.50	10.5	60	19.5	QP	N	GND

MEASUREMENT RESULT: "CTL110701129_fin2"

7/1/2011 5:06PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.238000	33.30	10.2	52	18.9	AV	N	GND
0.310000	27.20	10.2	50	22.8	AV	N	GND
0.474000	20.50	10.2	46	25.9	AV	N	GND
0.542000	34.50	10.2	46	11.5	AV	N	GND

SCAN TABLE: "Voltage (9K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL110701128_fin"

7/1/2011 5:03PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.158000	55.80	10.2	66	9.8	QP	L1	GND
0.234000	49.80	10.2	62	12.5	QP	L1	GND
0.238000	50.10	10.2	62	12.1	QP	L1	GND
25.484000	39.00	11.1	60	21.0	QP	L1	GND
25.760000	39.20	11.1	60	20.8	QP	L1	GND

MEASUREMENT RESULT: "CTL110701128_fin2"

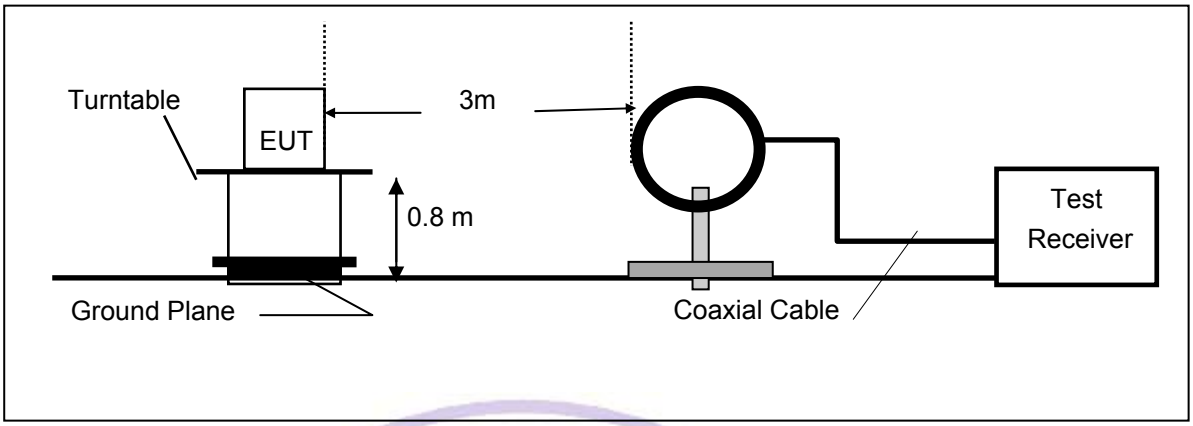
7/1/2011 5:03PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.158000	42.60	10.2	56	13.0	AV	L1	GND
0.234000	38.60	10.2	52	13.7	AV	L1	GND
0.314000	34.60	10.2	50	15.3	AV	L1	GND
0.542000	27.20	10.2	46	18.8	AV	L1	GND
0.710000	27.40	10.2	46	18.6	AV	L1	GND

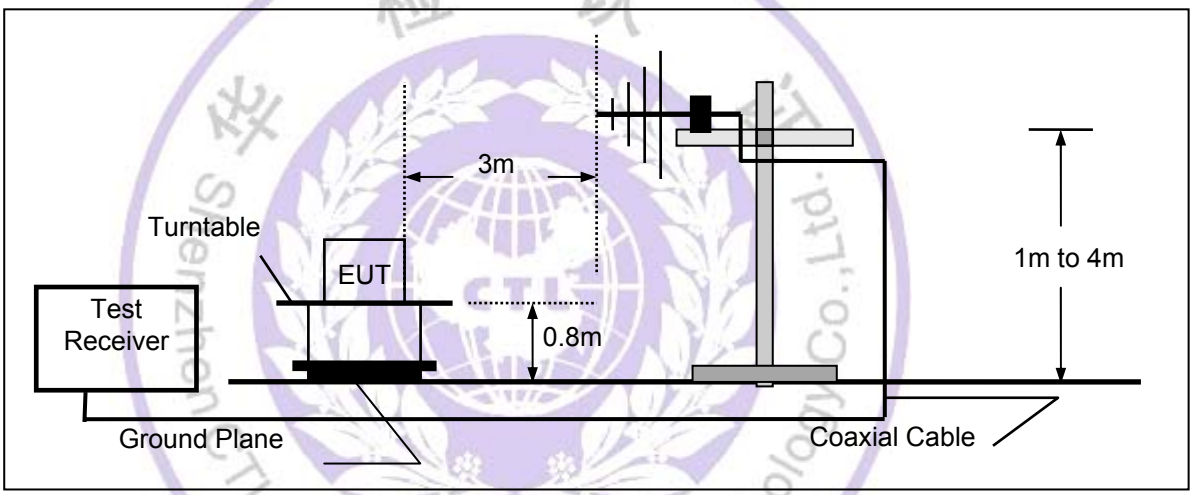
4.2. Spurious Radiated Emissions Test

TEST CONFIGURATION

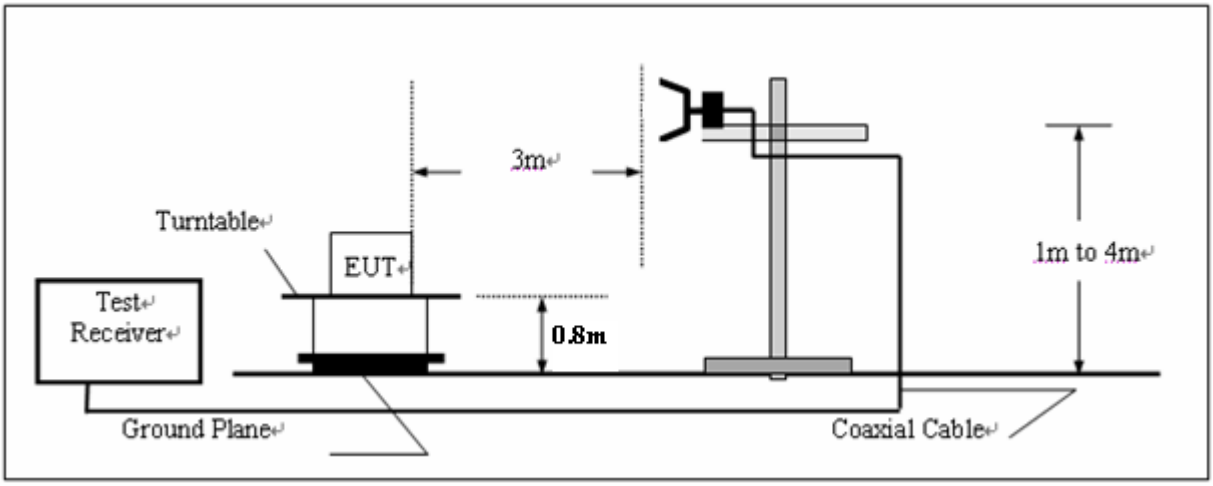
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

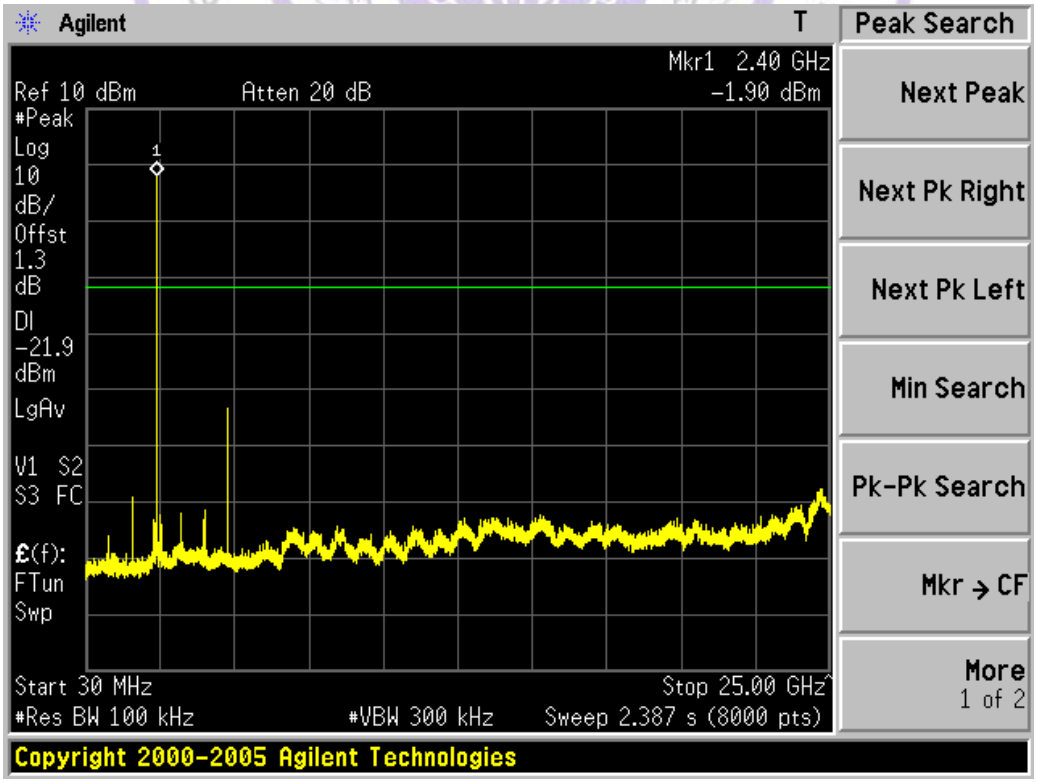
TEST PROCEDURE

1. The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
2. The EUT was placed on a turn table which is 0.8m above ground plane.
3. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT
4. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Repeat above procedures until all frequency measurements have been completed.

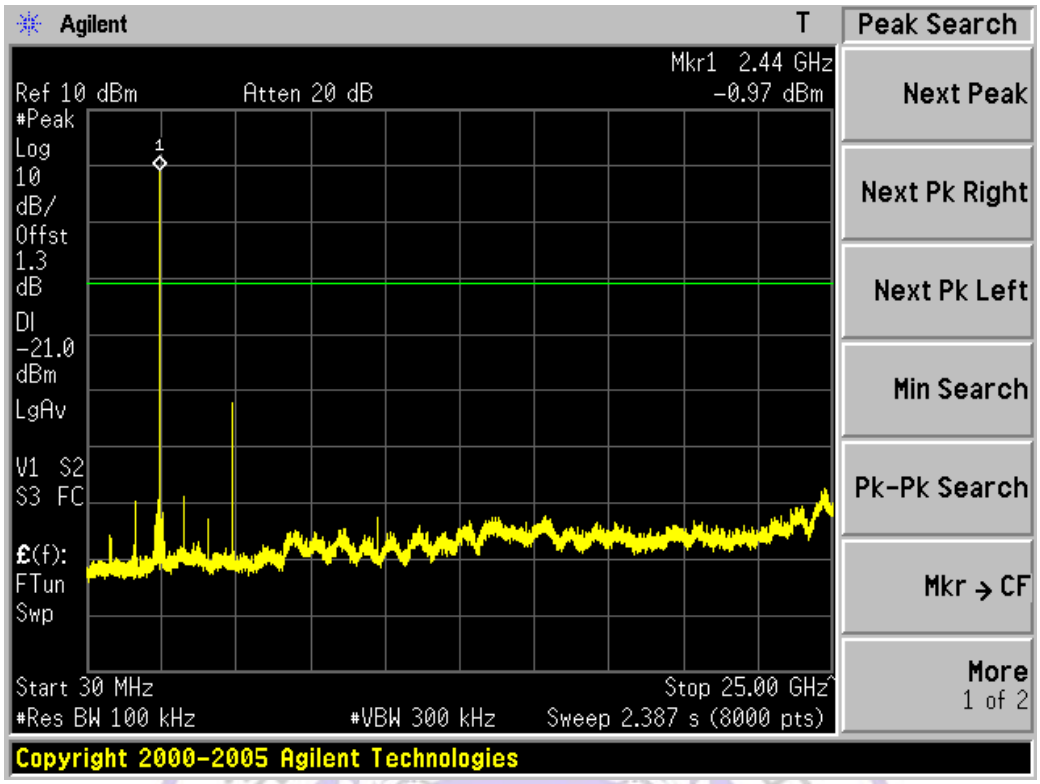
TEST RESULTS

Refer to attach tabular data sheets.

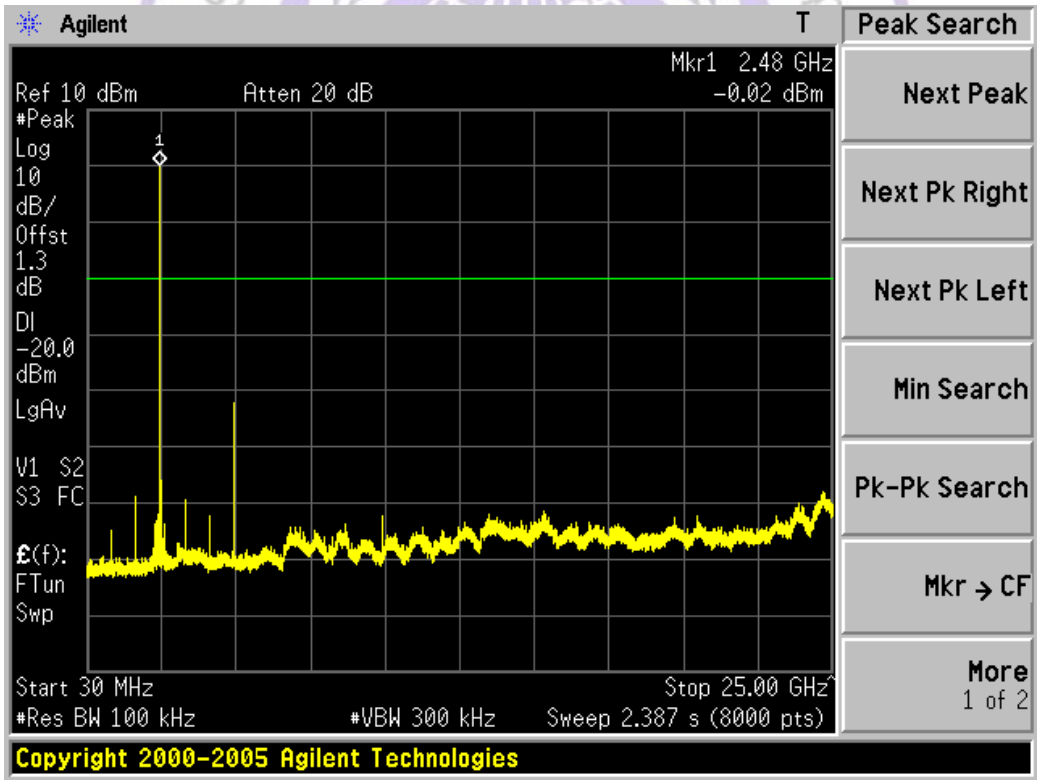
Conducted Spurious Emission Measurement Results
CH Low



CH Mid



CH High

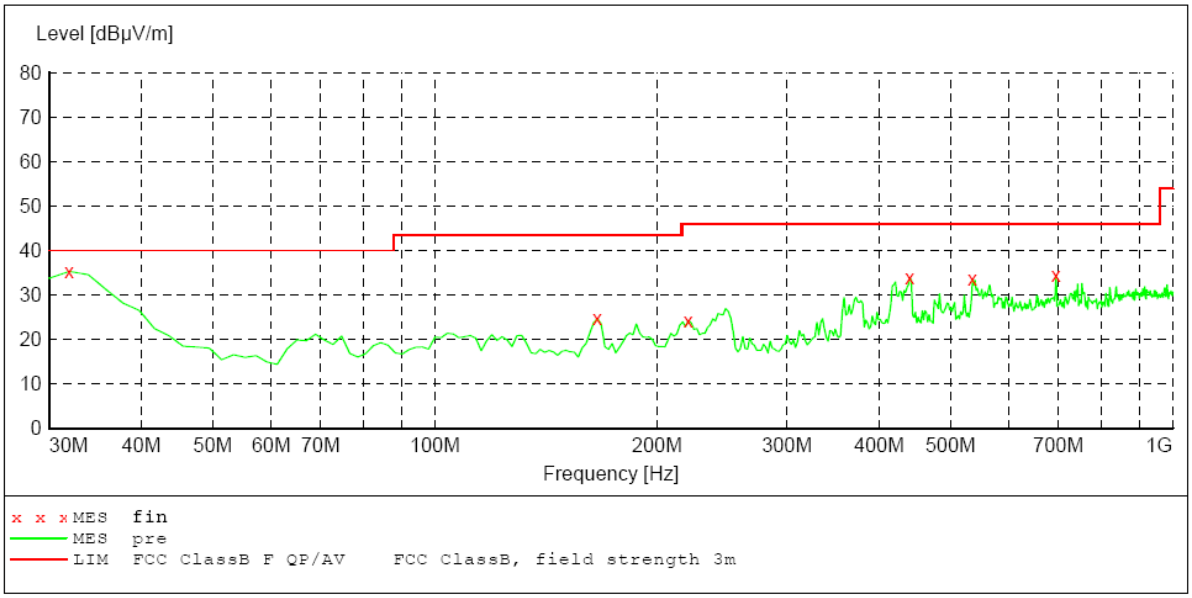


Radiated Spurious Emission Measurement Result (below 1GHz)

See the following plots:

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	120 kHz	HL562 10

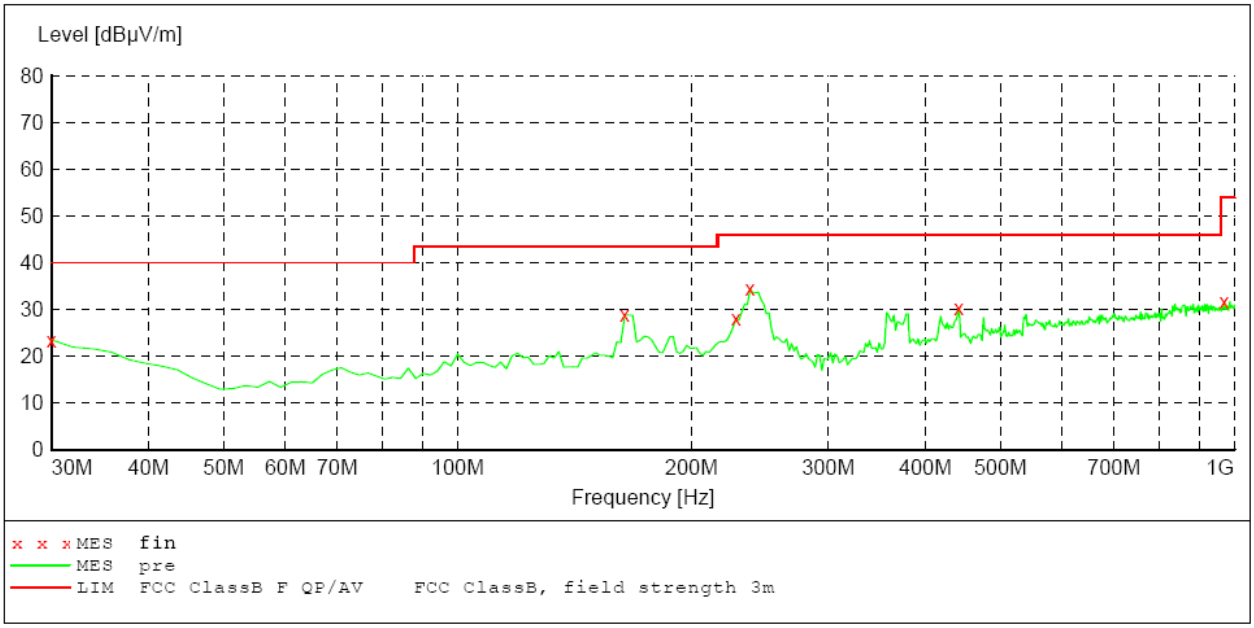


MEASUREMENT RESULT:

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
31.900000	35.30	20.1	40.0	4.7	QP	100.0	268.00	VERTICAL
166.000000	24.70	10.7	43.5	18.8	QP	100.0	291.00	VERTICAL
220.500000	24.20	11.3	46.0	21.8	QP	100.0	79.00	VERTICAL
440.100000	33.80	20.2	46.0	12.2	QP	100.0	291.00	VERTICAL
535.400000	33.50	21.1	46.0	12.5	QP	100.0	268.00	VERTICAL
694.800000	34.40	24.0	46.0	11.6	QP	100.0	358.00	VERTICAL

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	120 kHz	HL562 10



MEASUREMENT RESULT:

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	23.50	21.2	40.0	16.5	QP	300.0	124.00	HORIZONTAL
164.100000	28.80	10.6	43.5	14.7	QP	100.0	3.00	HORIZONTAL
228.200000	28.00	11.5	46.0	18.0	QP	100.0	360.00	HORIZONTAL
237.900000	34.40	11.8	46.0	11.6	QP	100.0	196.00	HORIZONTAL
442.100000	30.40	20.2	46.0	15.6	QP	100.0	57.00	HORIZONTAL
970.800000	31.70	25.6	54.0	22.3	QP	300.0	99.00	HORIZONTAL

Remark：

(1) Measuring frequencies from 30 MHz to the 1GHz。

(2) “F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency.

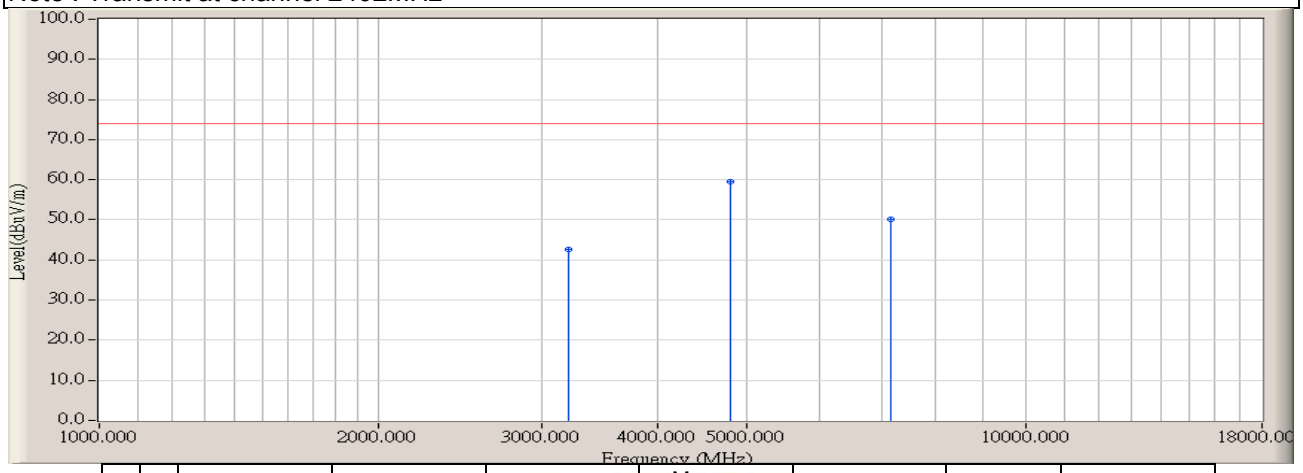
(3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.

(4) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

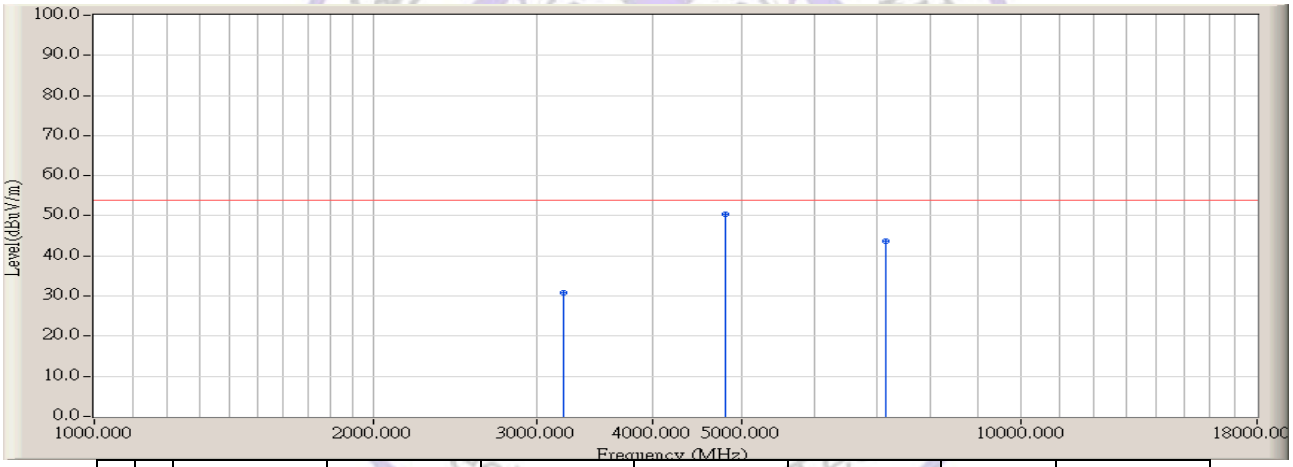
(5) The IF bandwidth of EMI Test Receiver between 25MHz to 1GHz was 120KHz.

Radiated Spurious Emission Measurement Result (above 1GHz)

HORIZONTAL
Note : Transmit at channel 2402MHz



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		3210.000	-1.490	44.194	42.704	-31.266	73.970	PEAK
2	*	4796.667	3.490	56.131	59.621	-14.349	73.970	PEAK
3		7148.333	13.013	37.240	50.253	-23.717	73.970	PEAK



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		3210.000	-1.490	32.300	30.810	-23.160	53.970	AVERAGE
2	*	4796.600	3.490	46.800	50.290	-3.680	53.970	AVERAGE
3		7148.333	13.013	30.600	43.613	-10.357	53.970	AVERAGE

Remark：

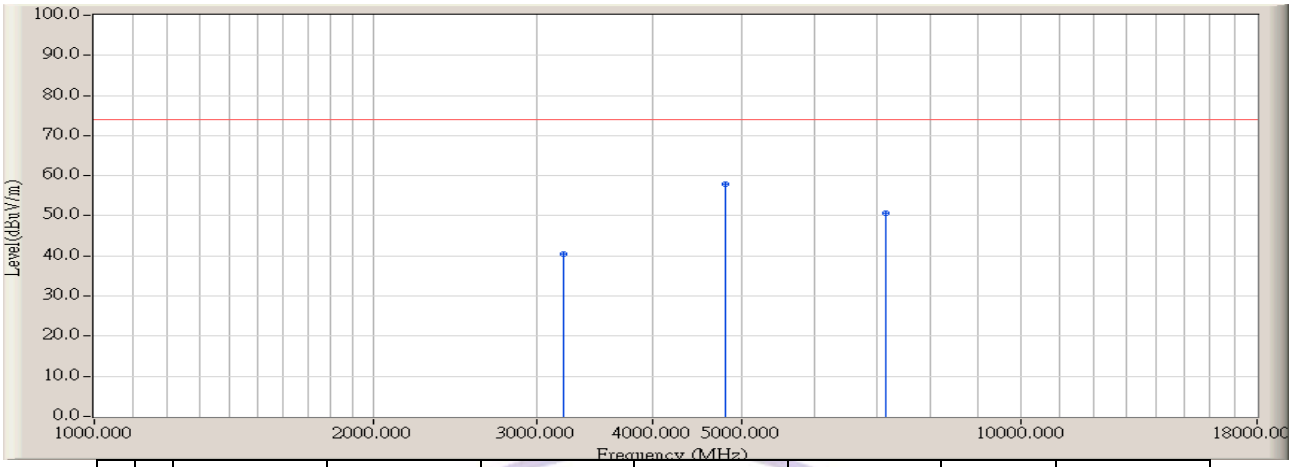
(1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

(2) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode of the emission shown in Actual FS column.

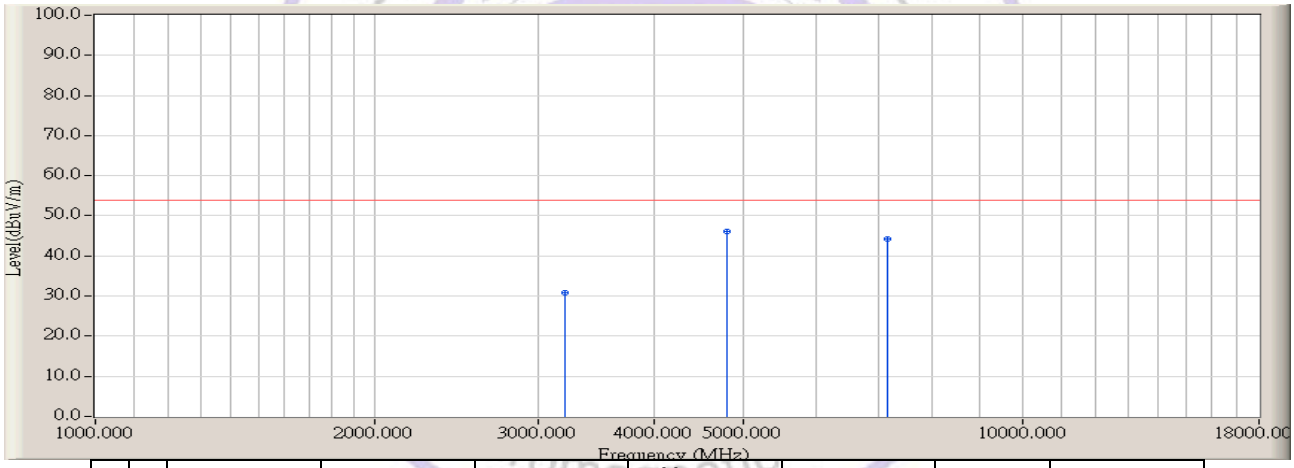
(3) Spectrum Peak Setting: 1GHz- 25GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
Spectrum AV Setting: 1GHz- 25GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

VERTICAL
Note : Transmit at channel 2402MHz



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		3210.000	-1.490	41.929	40.439	-33.531	73.970	PEAK
2	*	4796.667	3.490	54.523	58.013	-15.957	73.970	PEAK
3		7148.333	13.013	37.679	50.692	-23.278	73.970	PEAK



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		3210.000	-1.490	32.200	30.710	-23.260	53.970	AVERAGE
2	*	4796.667	3.490	42.600	46.090	-7.880	53.970	AVERAGE
3		7148.333	13.013	31.100	44.113	-9.857	53.970	AVERAGE

Remark：

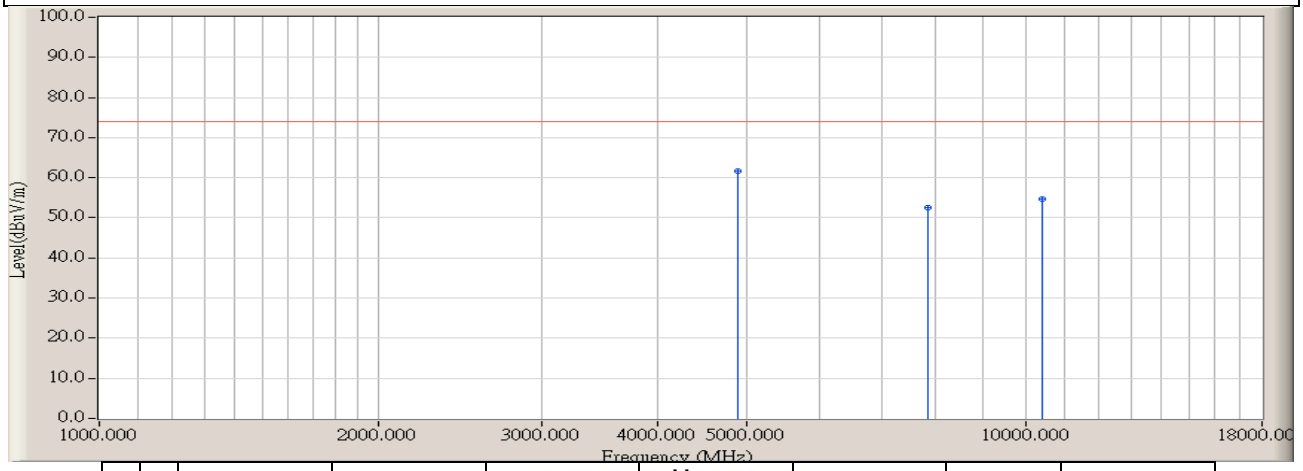
(1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

(2) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode of the emission shown in Actual FS column.

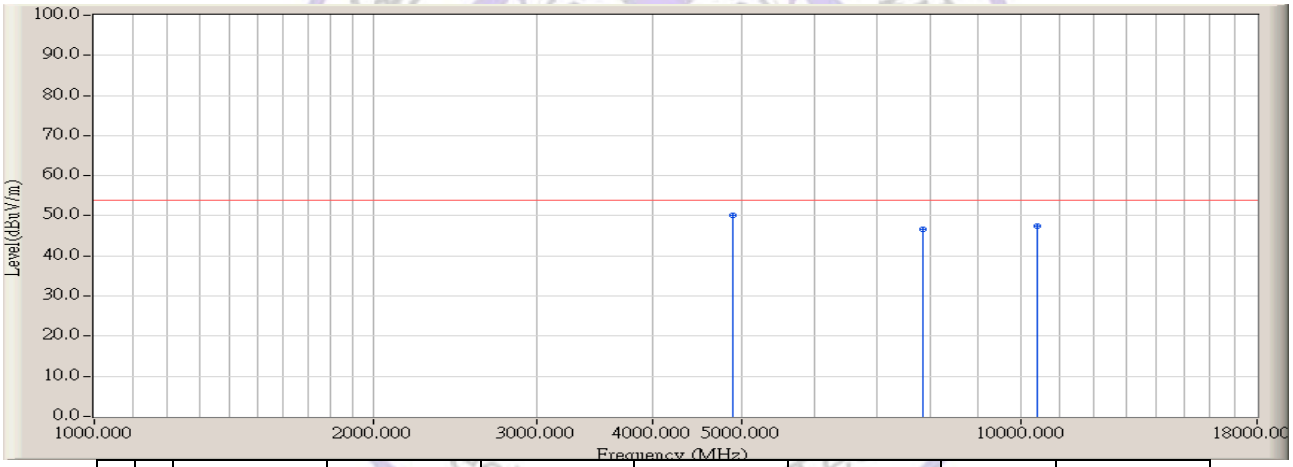
(3) Spectrum Peak Setting: 1GHz- 25GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
Spectrum AV Setting: 1GHz- 25GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

HORIZONTAL
Note : Transmit at channel 2441MHz



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4881.667	3.633	57.947	61.580	-12.390	73.970	PEAK
2	*	7856.667	14.566	37.877	52.444	-21.526	73.970	PEAK
3		10435.000	16.650	37.928	54.578	-19.392	73.970	PEAK



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4881.667	3.633	46.500	50.133	-3.837	53.970	AVERAGE
2	*	7856.667	14.566	32.200	46.767	-7.203	53.970	AVERAGE
3		10435.000	16.650	30.900	47.550	-6.420	53.970	AVERAGE

Remark：

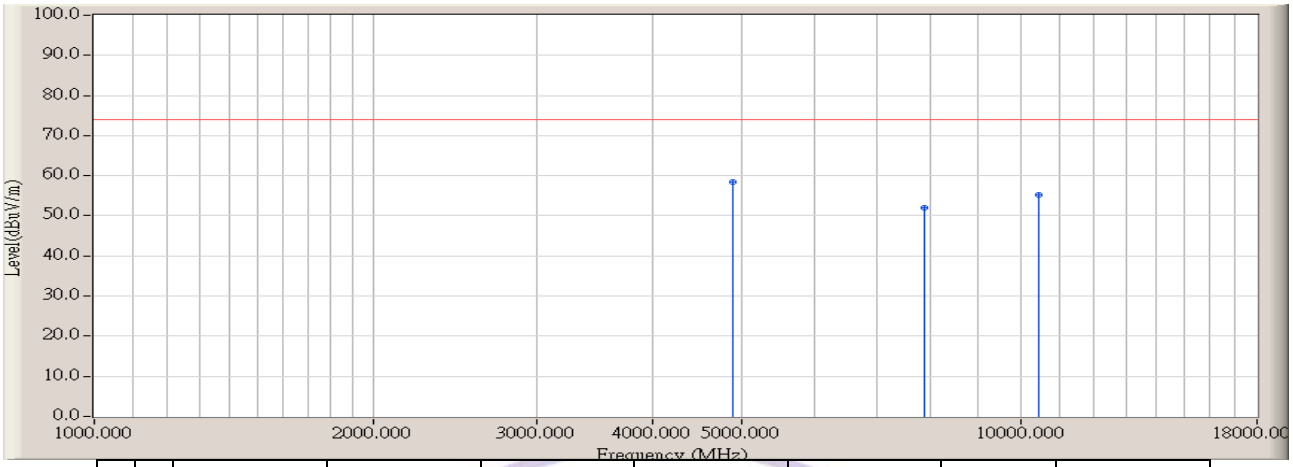
(1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

(2) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode of the emission shown in Actual FS column.

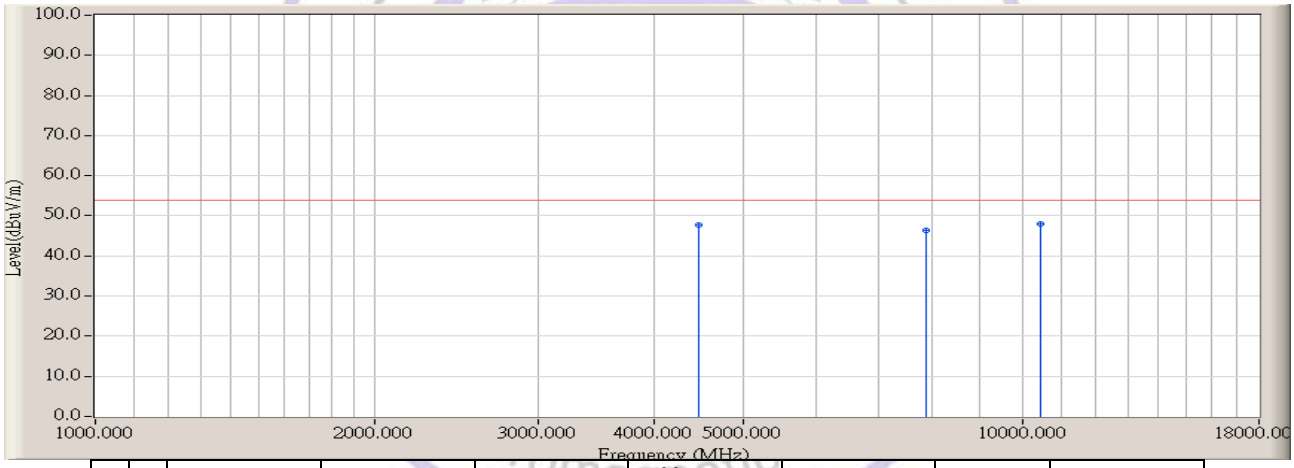
(3) Spectrum Peak Setting: 1GHz- 25GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
Spectrum AV Setting: 1GHz- 25GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

VERTICAL
Note : Transmit at channel 2441MHz



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4881.667	3.633	54.755	58.388	-15.582	73.970	PEAK
2	*	7885.000	13.990	38.080	52.070	-21.900	73.970	PEAK
3		10463.333	16.916	38.339	55.256	-18.714	73.970	PEAK



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4481.667	2.418	45.200	47.618	-6.352	53.970	AVERAGE
2	*	7885.000	13.990	32.500	46.490	-7.480	53.970	AVERAGE
3		10463.330	16.916	31.200	48.117	-5.853	53.970	AVERAGE

Remark：

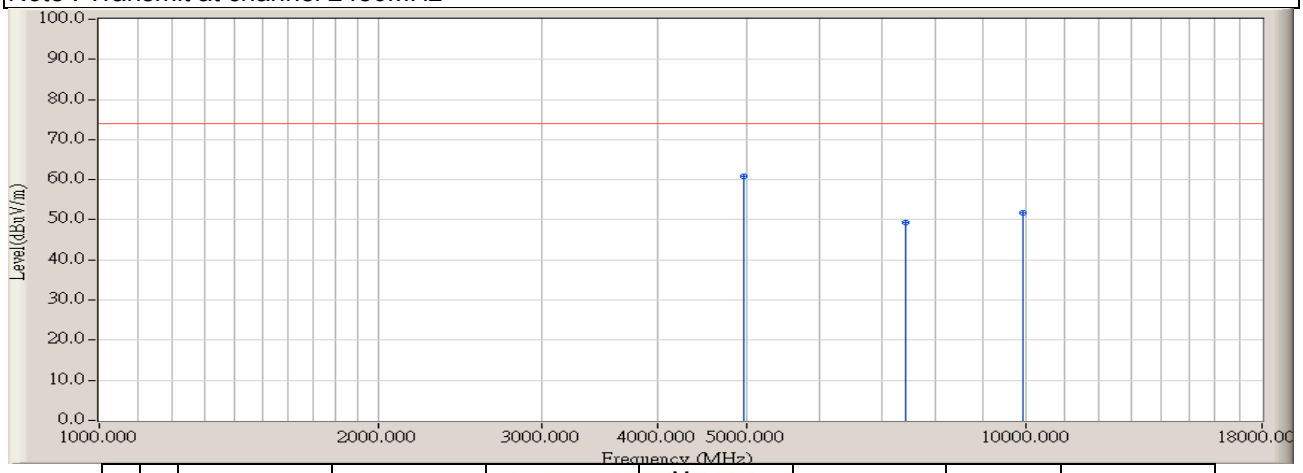
(1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

(2) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode of the emission shown in Actual FS column.

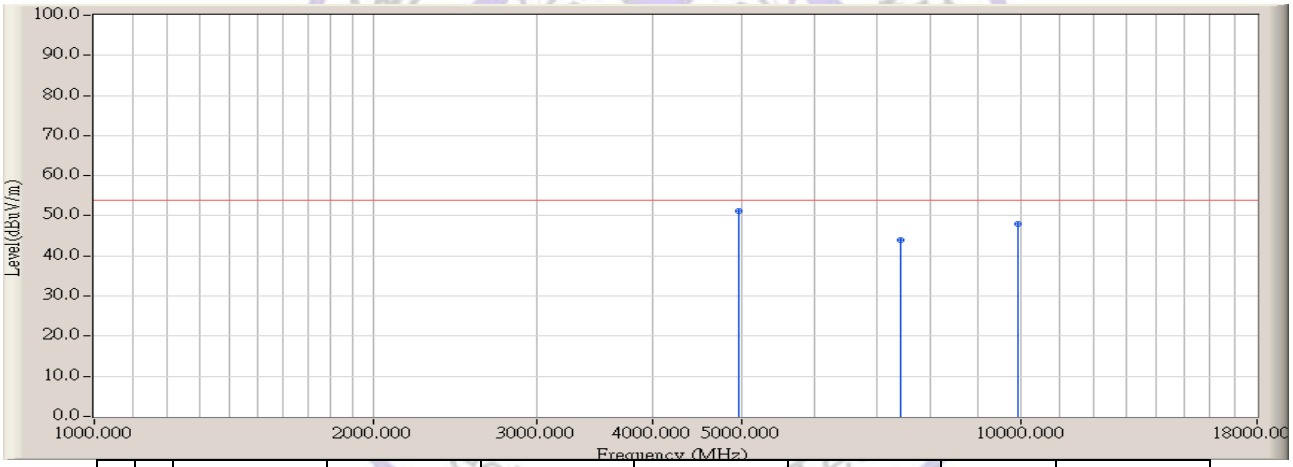
(3) Spectrum Peak Setting: 1GHz- 25GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
Spectrum AV Setting: 1GHz- 25GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

HORIZONTAL
Note : Transmit at channel 2480MHz



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4966.667	4.073	56.830	60.903	-13.067	73.970	PEAK
2	*	7431.667	11.500	37.820	49.320	-24.650	73.970	PEAK
3		9925.000	15.090	36.696	51.786	-22.184	73.970	PEAK



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4966.667	4.073	47.200	51.273	-2.697	53.970	AVERAGE
2	*	7431.667	11.500	32.400	43.900	-10.070	53.970	AVERAGE
3		9925.000	15.090	32.800	47.890	-6.080	53.970	AVERAGE

Remark：

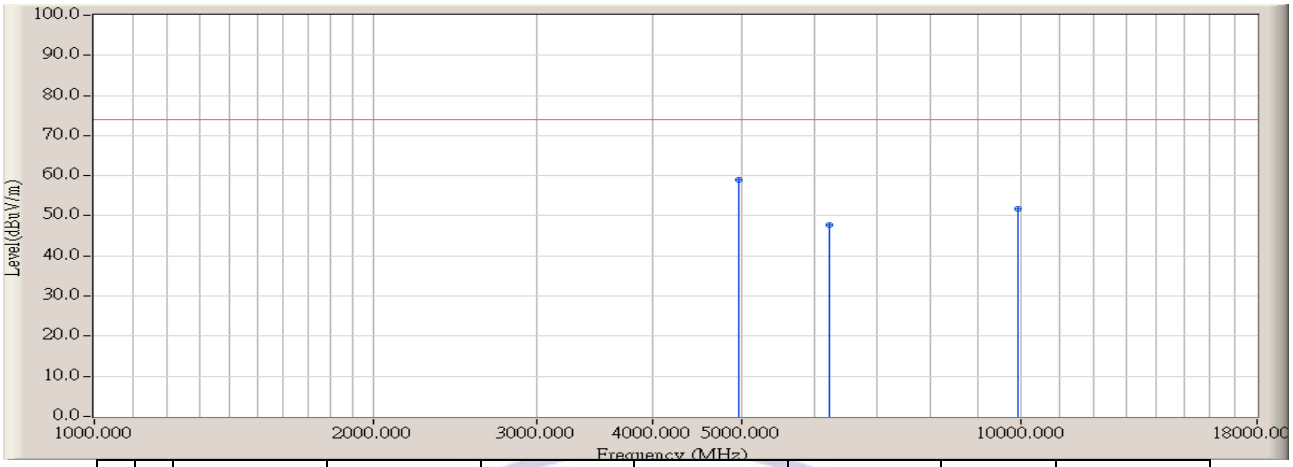
(1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

(2) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode of the emission shown in Actual FS column.

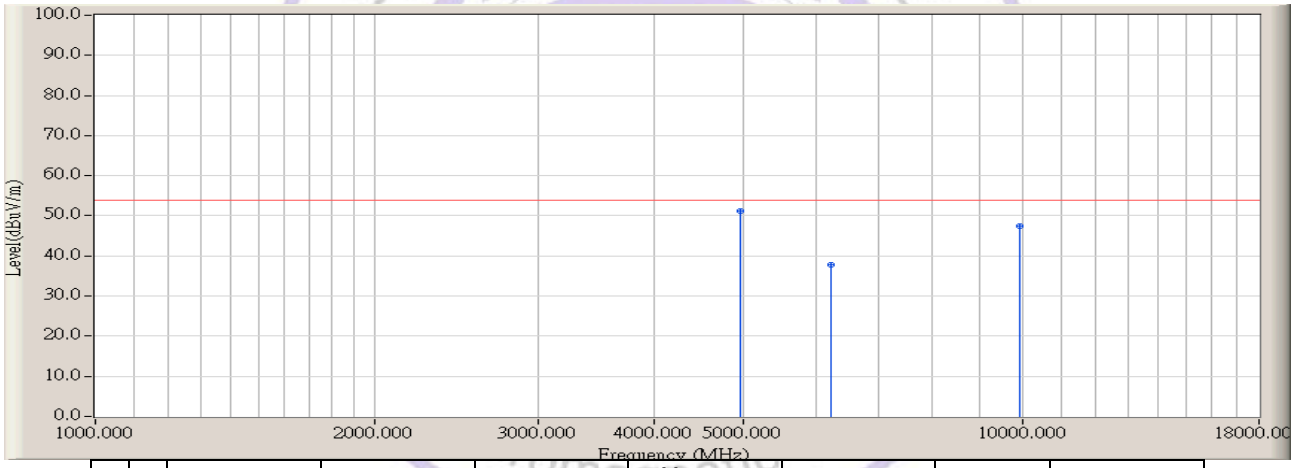
(3) Spectrum Peak Setting: 1GHz- 25GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
Spectrum AV Setting: 1GHz- 25GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

VERTICAL
Note : Transmit at channel 2480MHz



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4966.667	4.073	54.963	59.036	-14.934	73.970	PEAK
2	*	6213.333	7.690	40.021	47.711	-26.259	73.970	PEAK
3		9925.000	15.090	36.525	51.615	-22.355	73.970	PEAK



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4966.667	4.073	47.200	51.273	-2.697	53.970	AVERAGE
2	*	6213.333	7.690	30.100	37.790	-16.180	53.970	AVERAGE
3		9925.000	15.090	32.400	47.490	-6.480	53.970	AVERAGE

Remark：

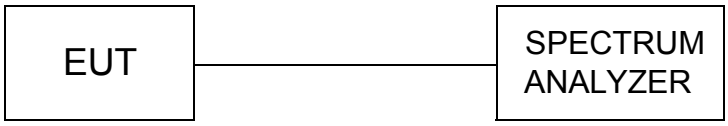
(1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.

(2) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode of the emission shown in Actual FS column.

(3) Spectrum Peak Setting: 1GHz- 25GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
Spectrum AV Setting: 1GHz- 25GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

4.3. 20dB Bandwidth Measurement

TEST CONFIGURATION



TEST PROCEDURE

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. Place the EUT on the table and set it in transmitting mode.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set the spectrum analyzer as RBW=10 KHz VBW=30 KHz. Span=4MHz.
5. Mark the peak frequency and -20dB (upper and lower) frequency.
6. Repeat above procedures until all frequency measured were complete.

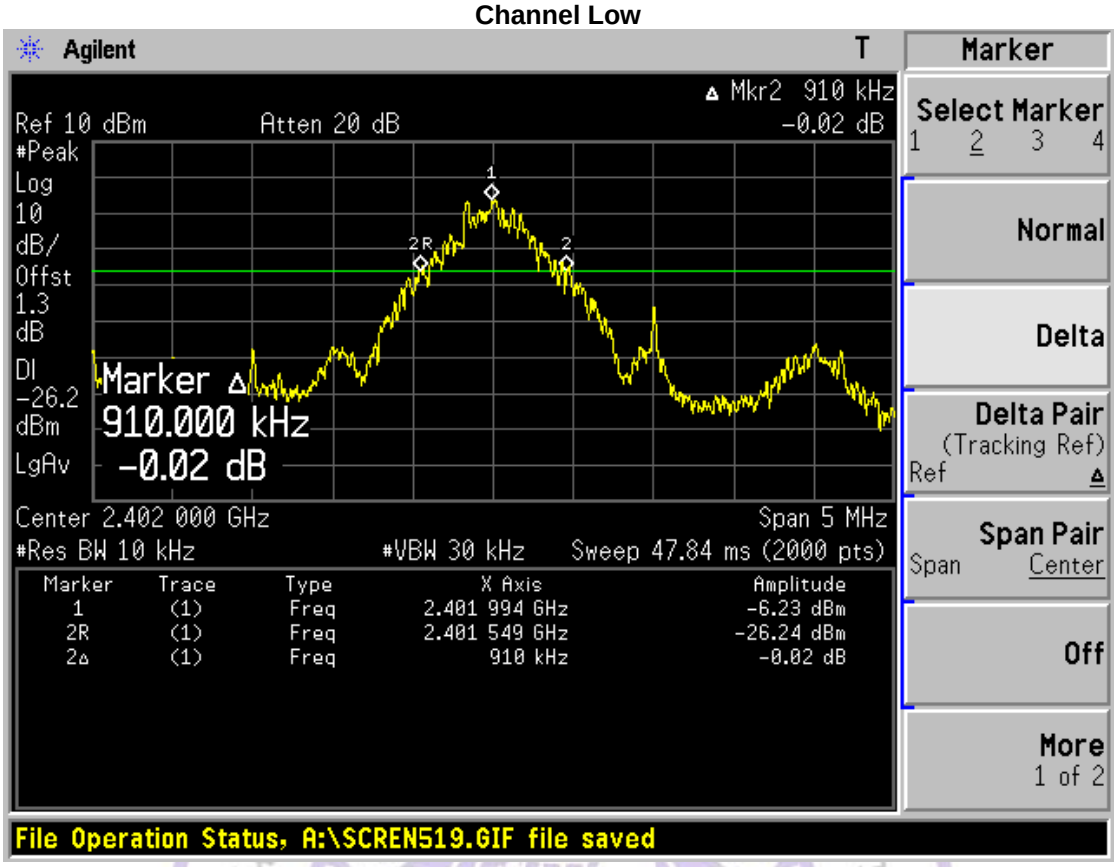
Note: For frequency hopping systems operating in the 2400MHz-2483.5MHz no limit for 20dB bandwidth.

TEST RESULTS

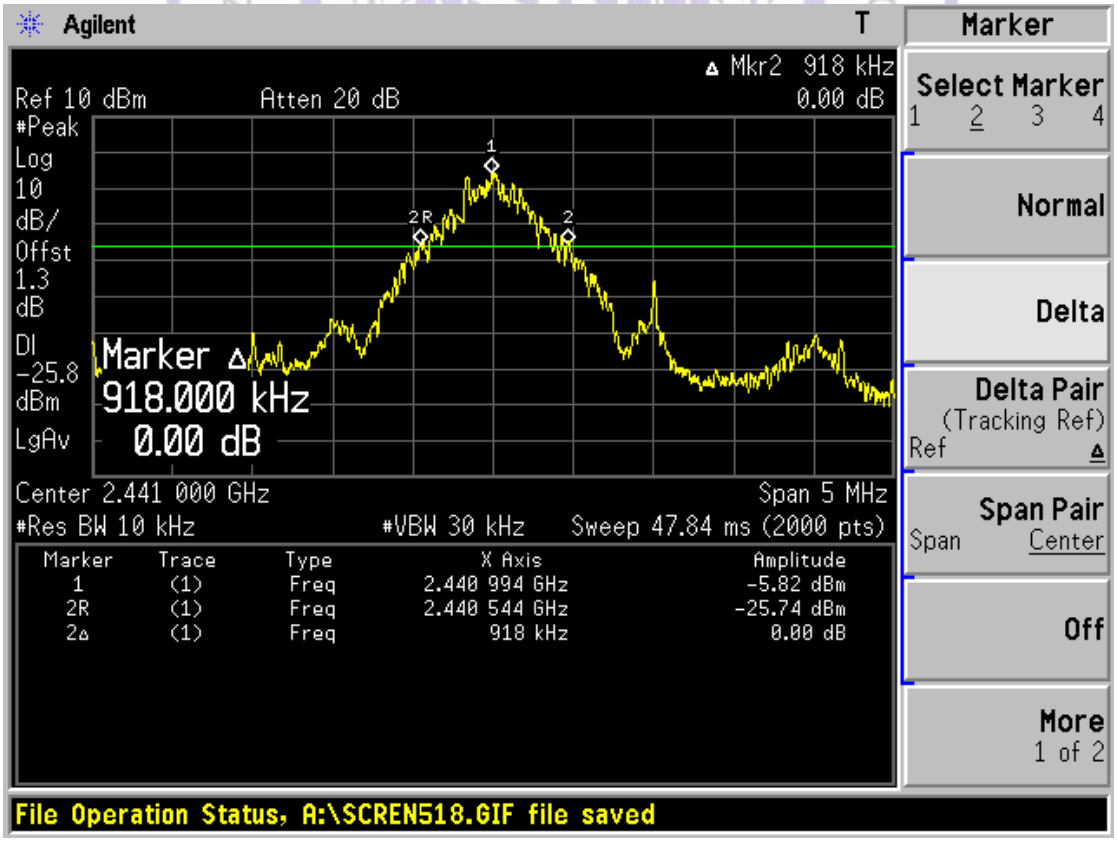
Channel	20 dB Bandwidth (MHz)	Pass / Fail
Lower	0.910	PASS
Mid	0.918	PASS
Higher	0.930	PASS

20dB Bandwidth Test Plots:

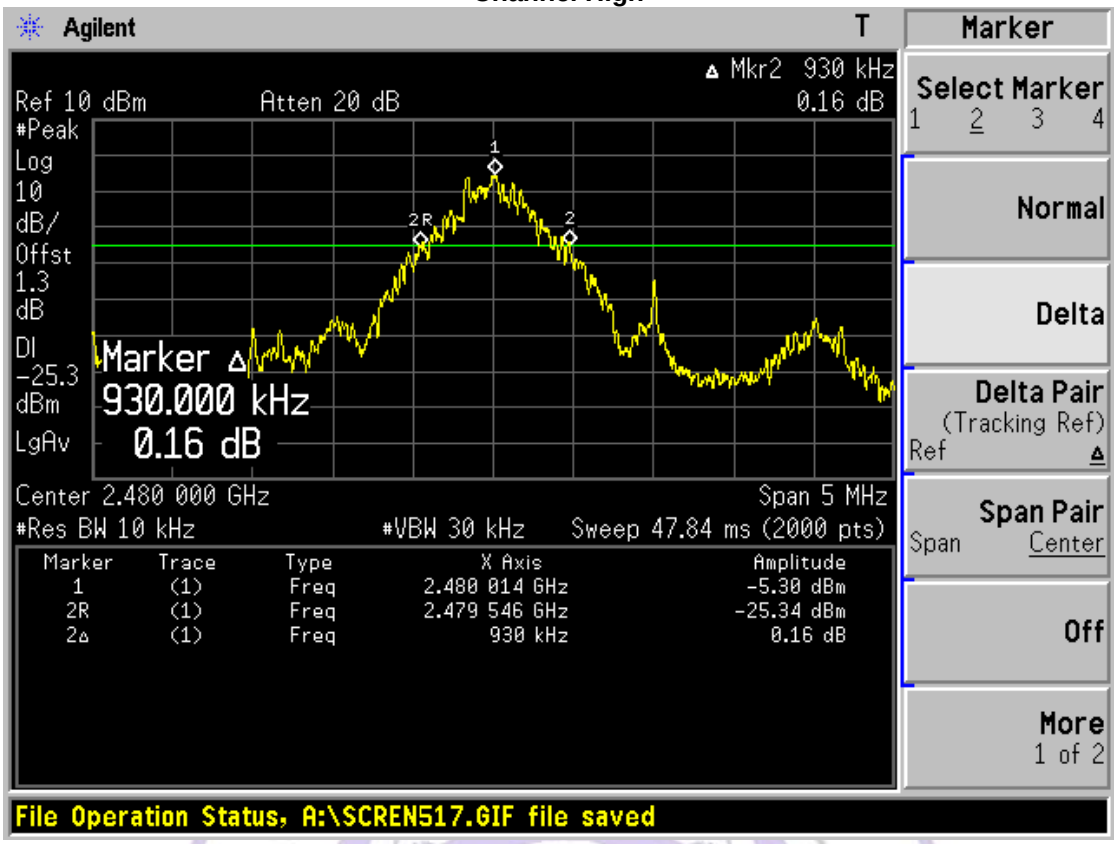
Channel Low



Channel Mid

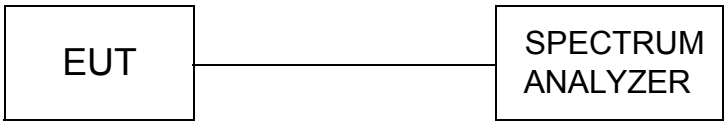


Channel High



4.4. Peak Output Power Measurement

TEST CONFIGURATION



TEST PROCEDURE

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. Place the EUT on the table and set it in transmitting mode.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set the spectrum analyzer as RBW=1 MHz, VBW = 3 MHz
5. Repeat above procedures until all frequency measured were complete

LIMIT

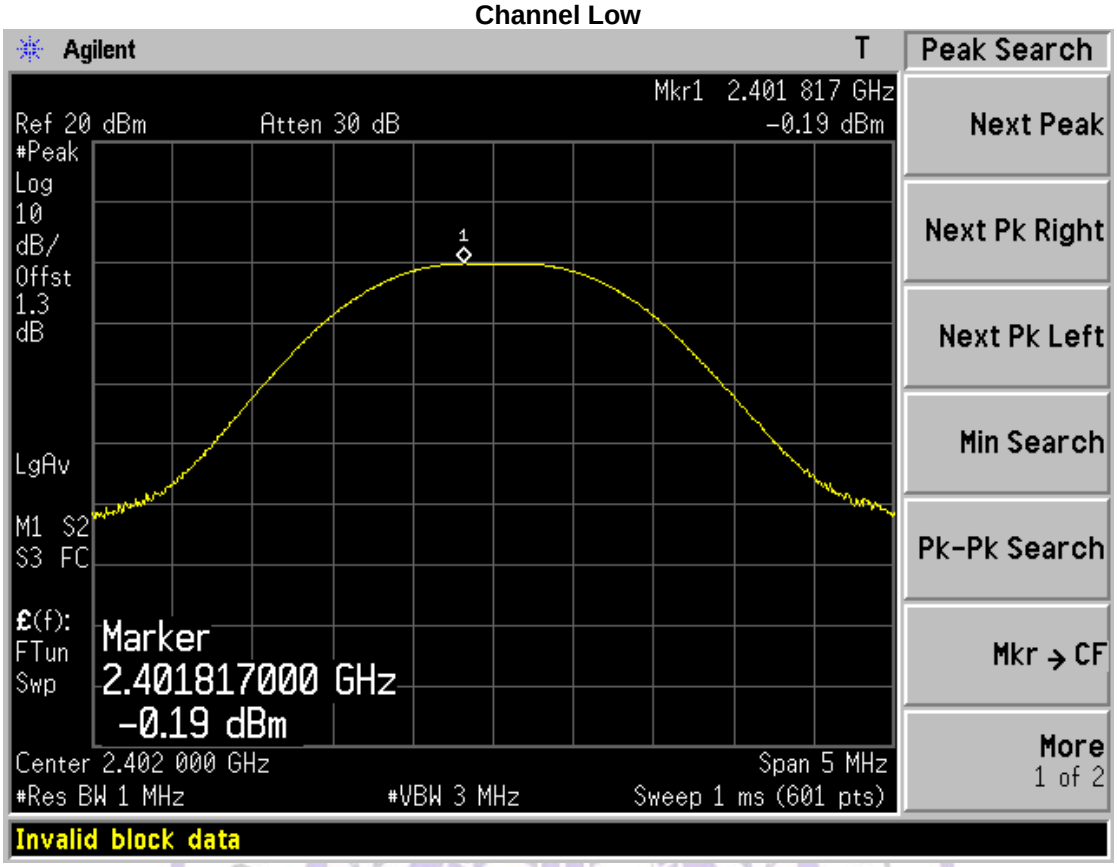
The Peak Output Power Measurement limits are 30dBm.

TEST RESULTS

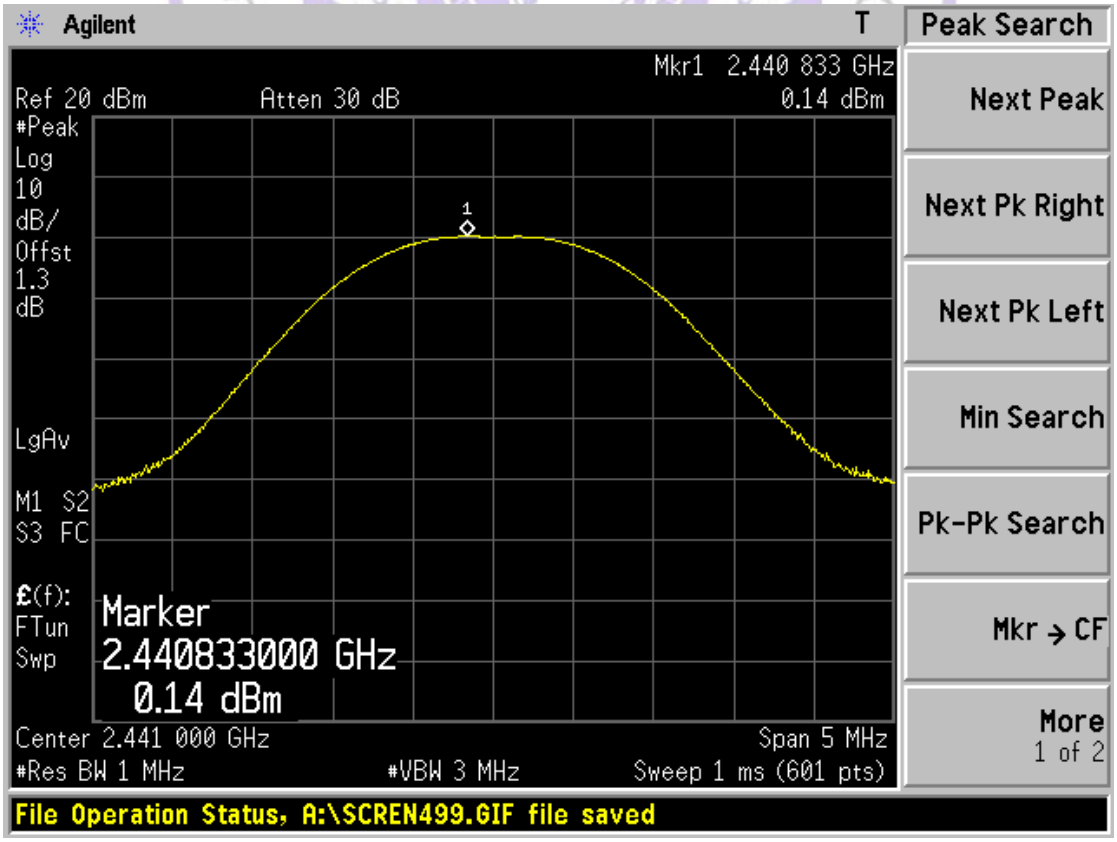
Channel	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass / Fail
LOW	2402.00	-0.19	30	PASS
MID	2441.00	0.14	30	PASS
HIGH	2480.00	0.63	30	PASS

Photo of Peak Output Power Measurement:

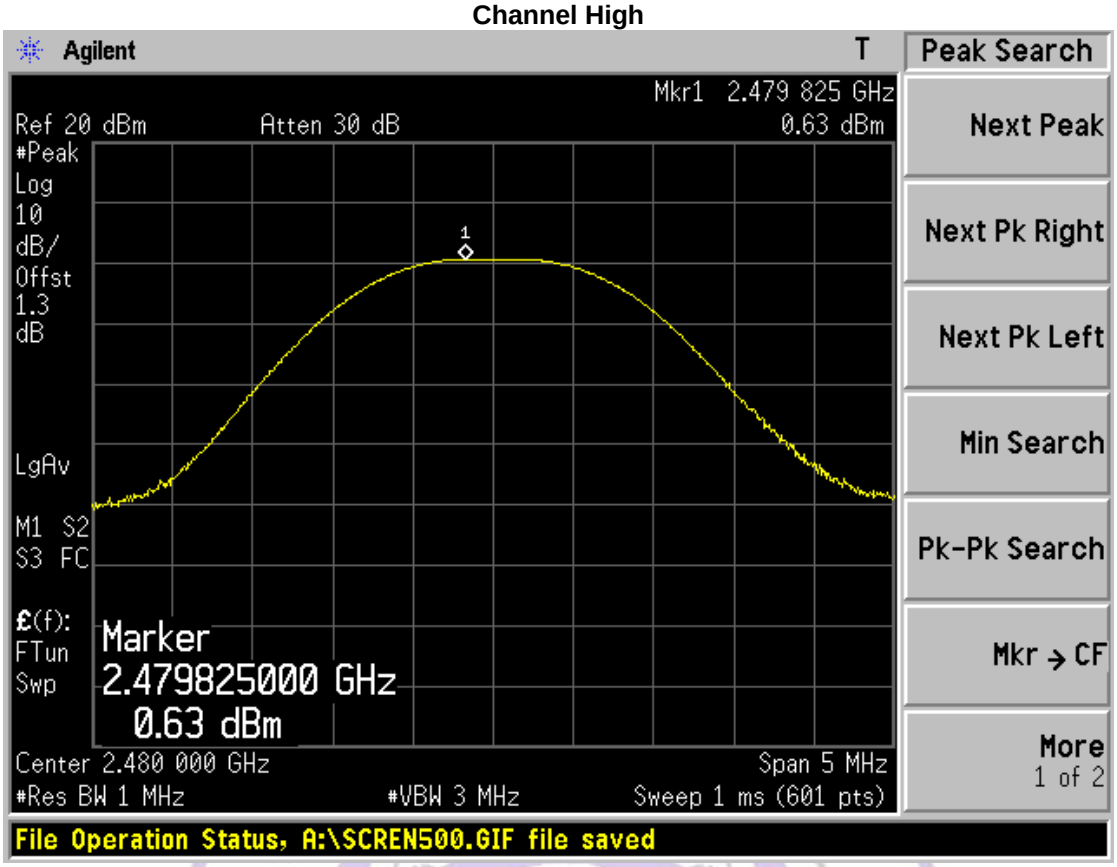
Channel Low



Channel Mid

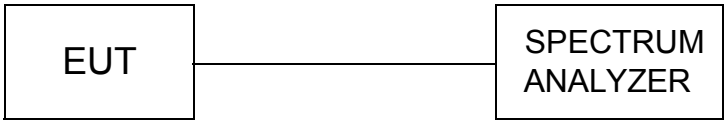


Channel High



4.5. 100 KHz Bandwidth of Band Edges Measurement

TEST CONFIGURATION



TEST PROCEDURE

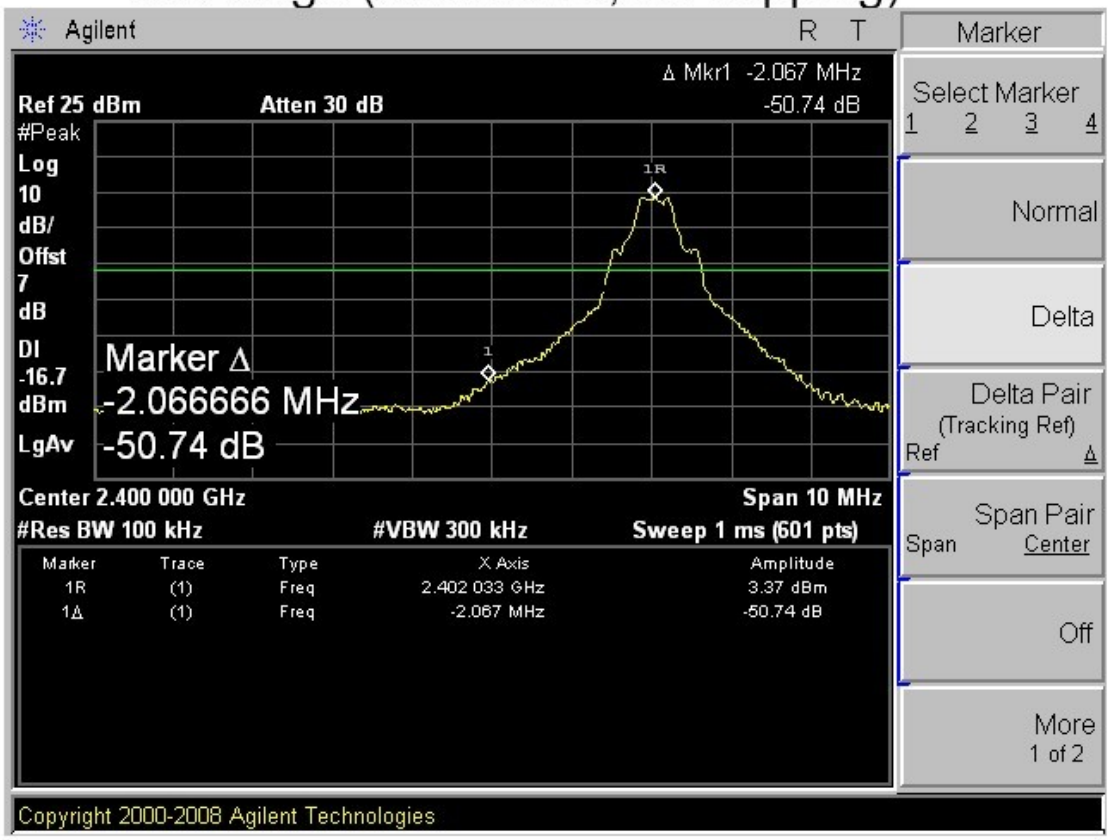
1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. Place the EUT on the table and set it in transmitting mode.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set the spectrum analyzer as RBW, VBW=100 KHz. Span=25MHz, Sweep=auto
5. Set center frequency of spectrum analyzer = operating frequency.
6. Repeat above procedures until all frequency measured was complete.

LIMIT

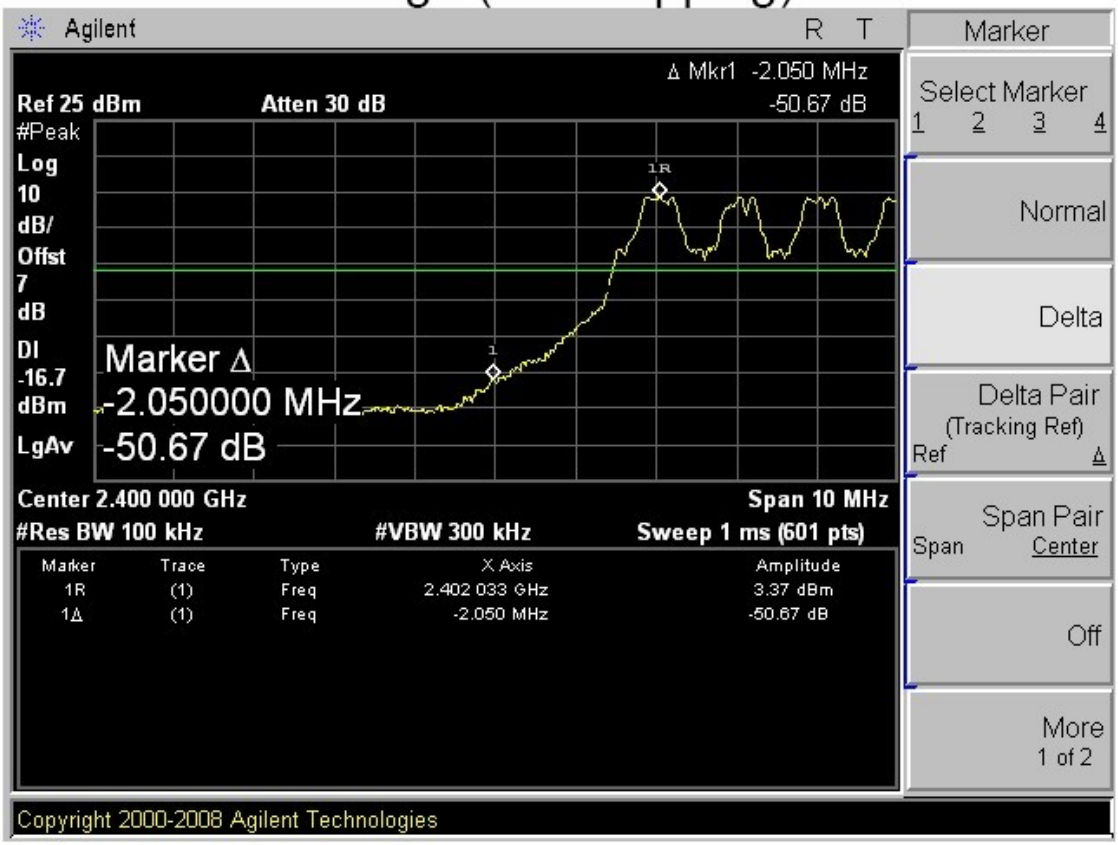
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10log(P) dB.

TEST RESULTS

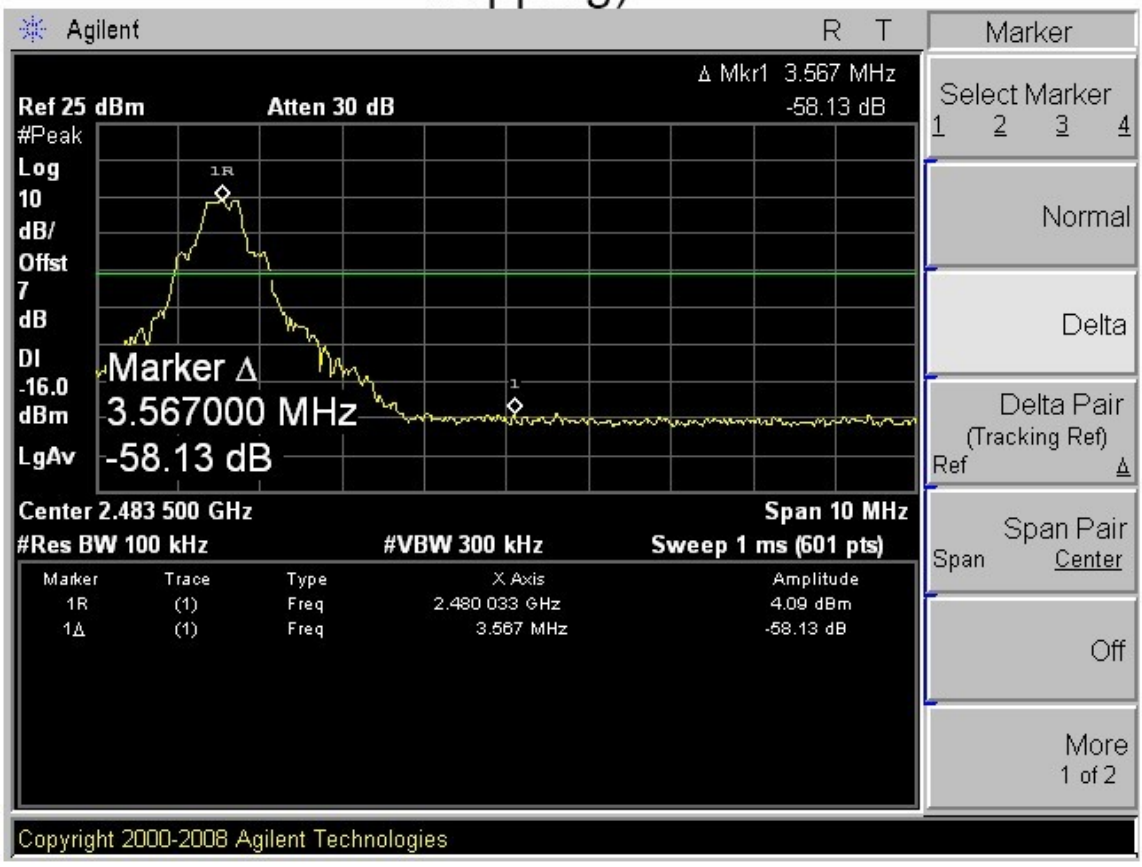
Low edge (Channel 0, no hopping)



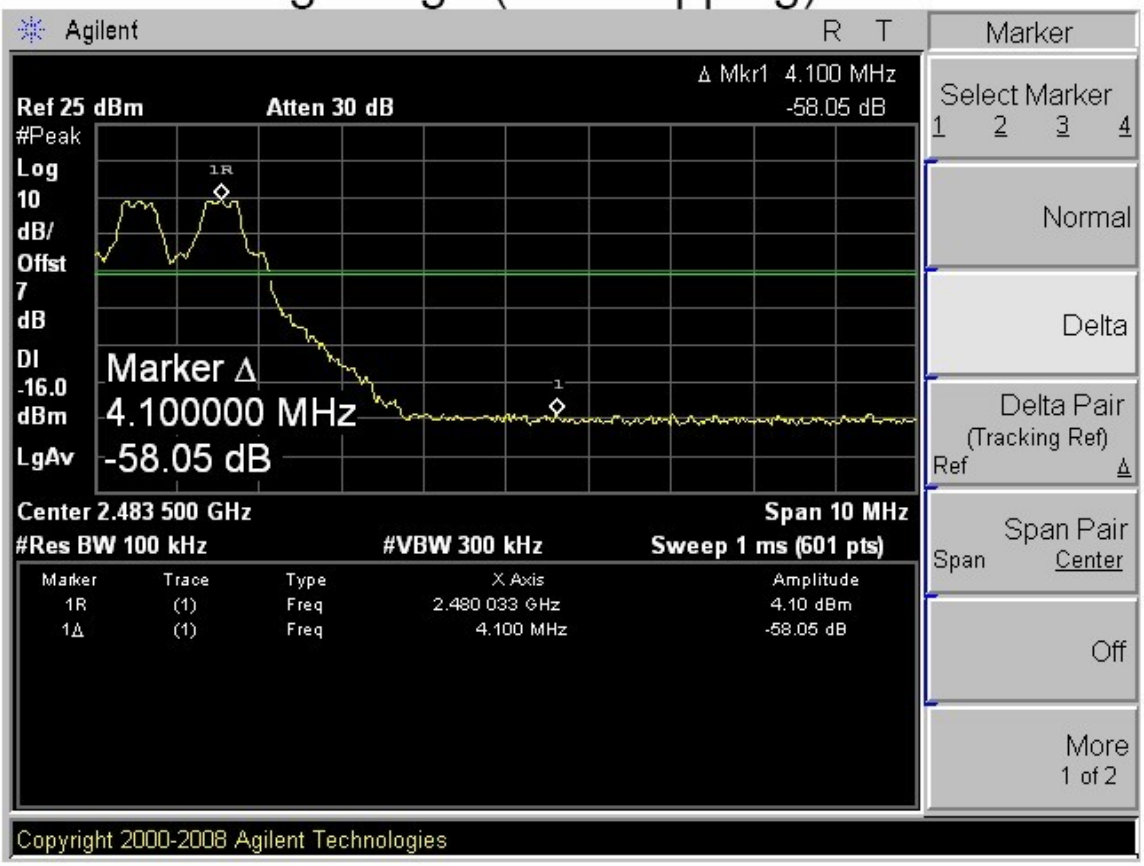
Low edge (with hopping)



High edge (Channel 78, no hopping)



High edge (with hopping)



Radiated Emission:

Operation Mode : TX CH Low
Fundamental Frequency: 2402 MHz

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
2390.0	---					74.00	54.00		Peak
2386.0	---					74.00	54.00		Peak
2384.0	---					74.00	54.00		Peak

Operation Mode	TX CH Low		
Fundamental Frequency	2402 MHz		
Temperature	25 ℃	Pol	Hor.
Humidity	65 %		

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
2390.0	---					74.00	54.00		Peak
2386.0	---					74.00	54.00		Peak
2384.0	---					74.00	54.00		Peak

Remark :

(1) Datas of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(2) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column。

(3) Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

(4) Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Operation Mode: TX CH High
Fundamental Frequency: 2480 MHz

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
2483.6	---		---	---		74.00	54.00	---	Peak
2484.0	---		---	---		74.00	54.00	---	Peak
2484.8	---		---	---		74.00	54.00	---	Peak

Operation Mode	TX CH High
Fundamental Frequency	2480 MHz
Temperature	25 ℃
Humidity	65 %

Pol Hor.

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
2483.6	---		---	---		74.00	54.00	---	Peak
2484.0	---		---	---		74.00	54.00	---	Peak
2484.8	---		---	---		74.00	54.00	---	Peak

Remark :

(1) Datas of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

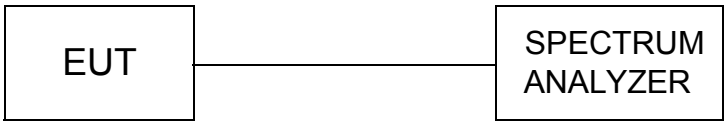
(2) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column。

(3) Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.

(4) Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

4.6. Frequency Separation

TEST CONFIGURATION



TEST PROCEDURE

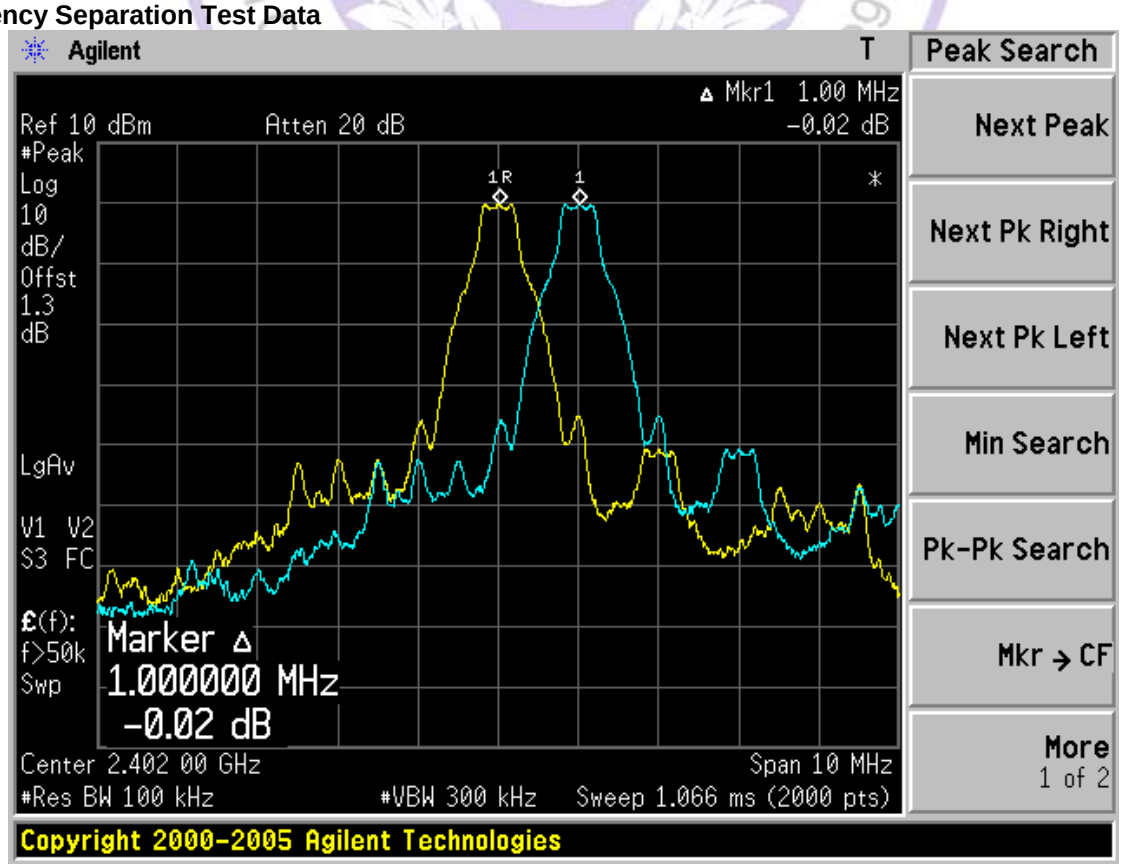
1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. Place the EUT on the table and set it in transmitting mode.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set the spectrum analyzer as RBW=100 KH, VBW=300 KHz. Span=10 MHz
5. Set center frequency of spectrum analyzer = middle of hopping channel.
6. Max hold. Mark 3 Peaks of hopping channel and record the 3 peaks frequency.

LIMIT

Limits and Measurement Result Of Channel Separation		
Applicable Limits	Measurement Result	
	Test Data	Criteria
Per 15.247 (a)(1) At least 25 KHz or 20 dB bandwidth of the hopping Channel, whichever is greater	1 MHz	PASS

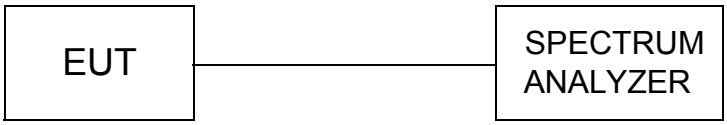
TEST RESULTS

Frequency Separation Test Data



4.7. Number of Hopping Frequency

TEST CONFIGURATION



TEST PROCEDURE

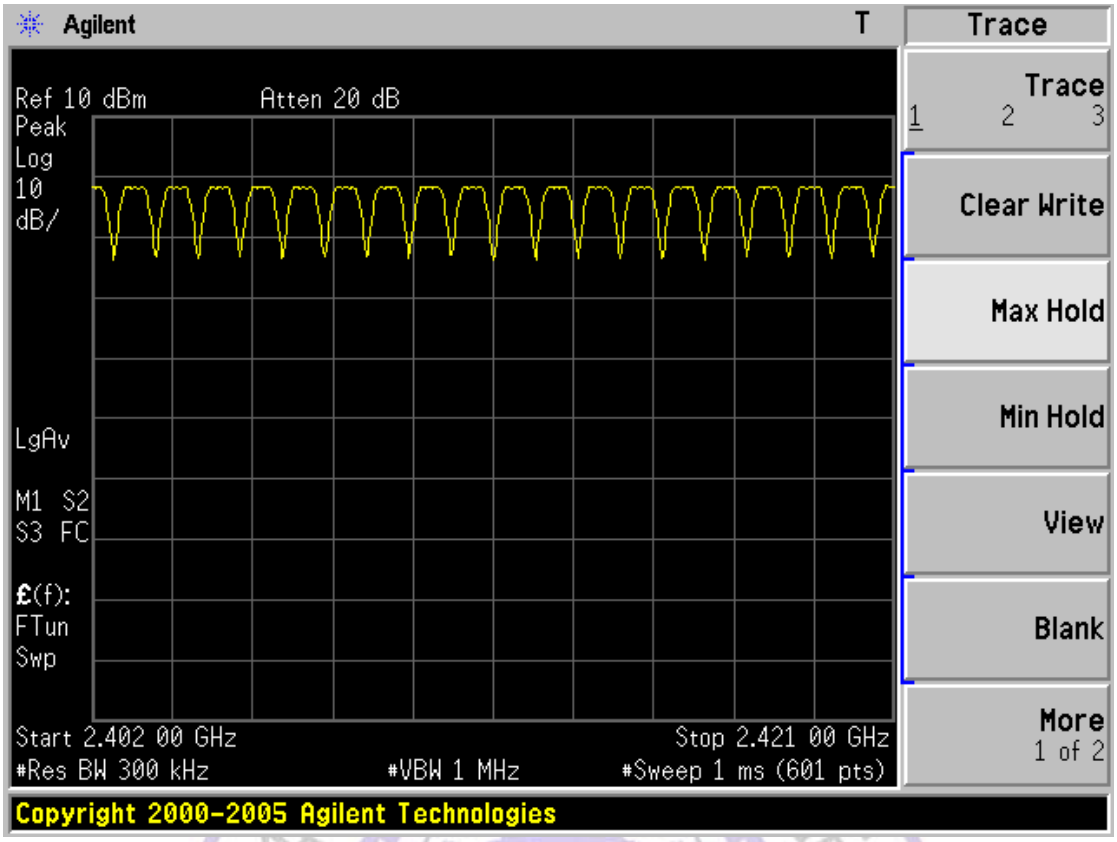
1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. Place the EUT on the table and set it in transmitting mode.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set the spectrum analyzer Start=2400MHz, Stop=2483.5MHz, Sweep=auto.
5. Set the spectrum analyzer as RBW, VBW=100 KHz.
6. Max hold. view and count how many channel in the band.

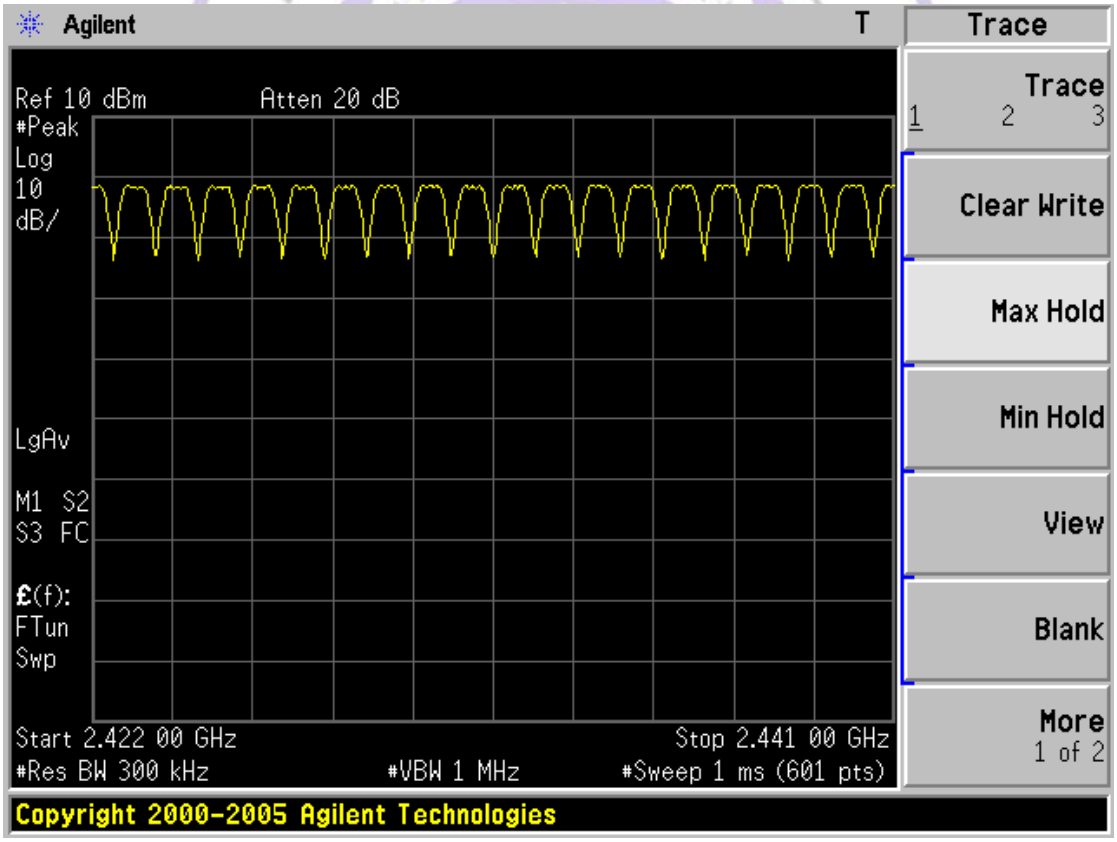
LIMIT

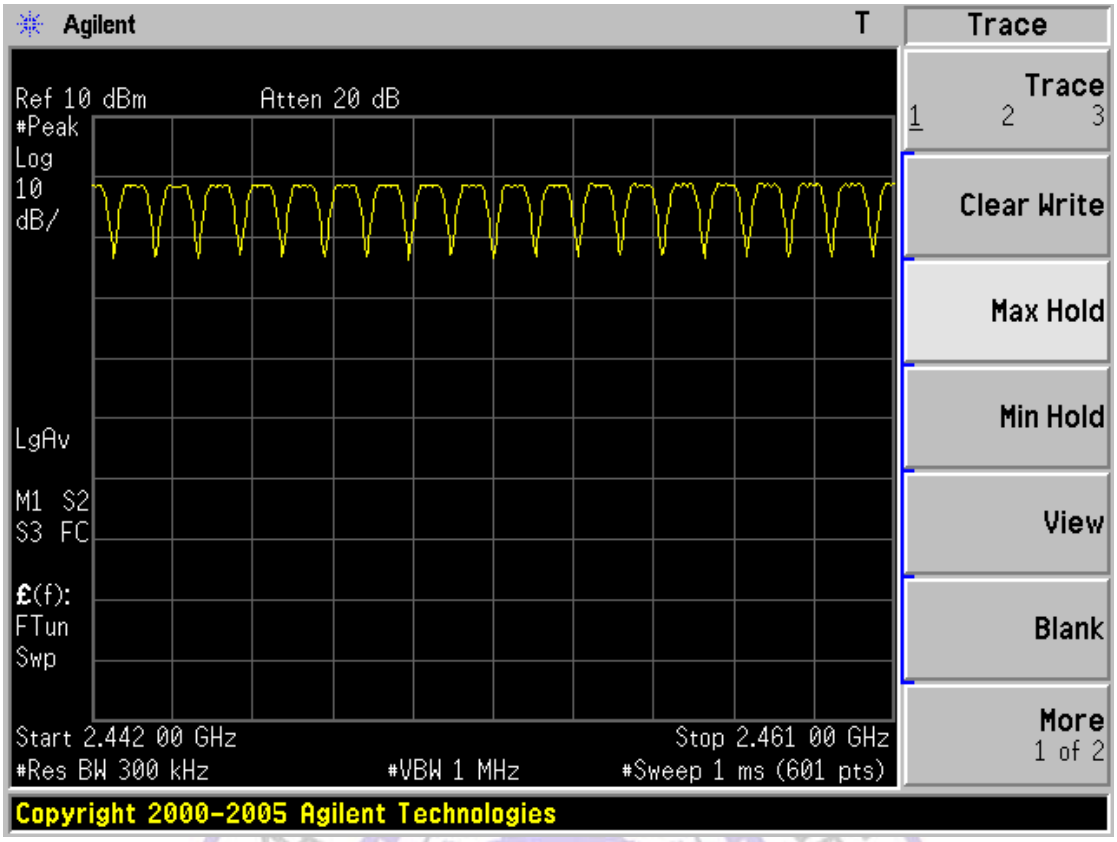
Limits and Measurement Result Of Hopping Channel		
Applicable Limits	Measurement Result	
	Test Data	Criteria
Per 15.247 (a)(1)(iii) At least 15 hopping Frequencies	Total 79 Channels	PASS

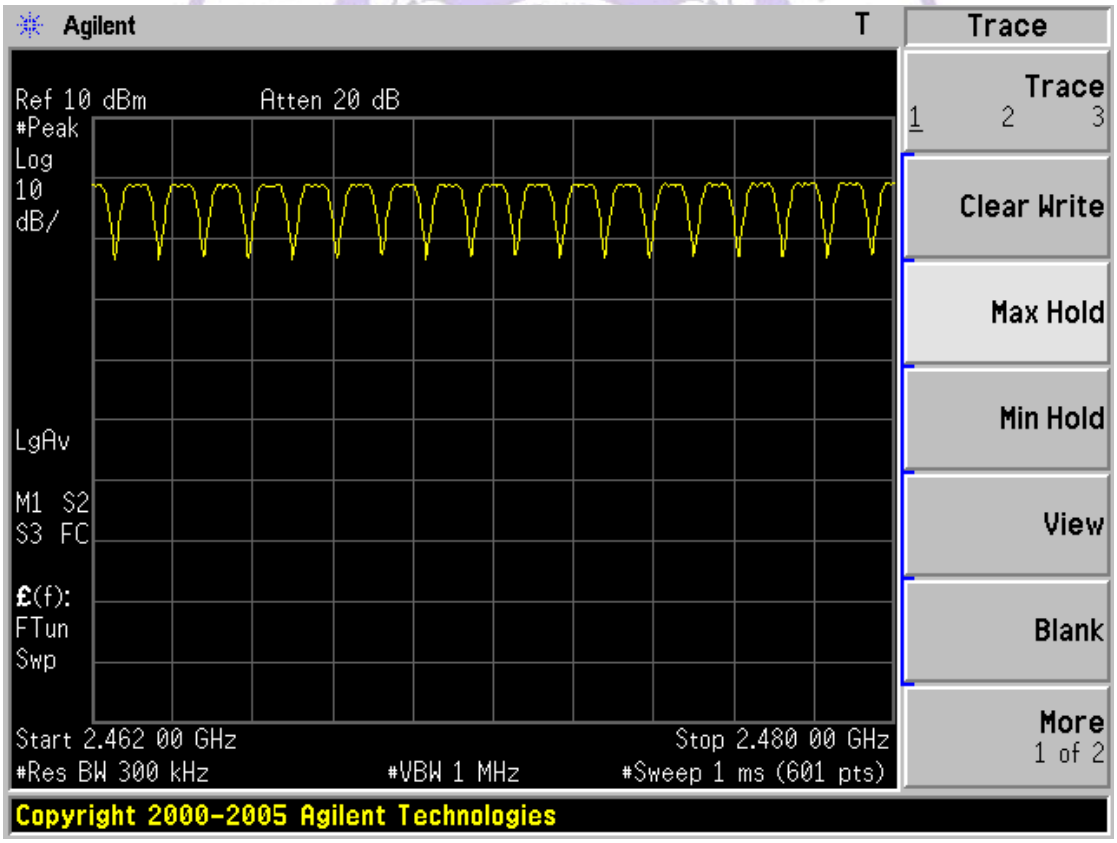
TEST RESULTS

Channel Number on the following plots:


Agilent
T
Trace
Ref 10 dBm
Atten 20 dB
Peak
Log
10
dB/
LgAv
M1 S2
S3 FC
£(f):
FTun
Swp
Start 2.402 00 GHz
#Res BW 300 kHz
#VBW 1 MHz
Stop 2.421 00 GHz
#Sweep 1 ms (601 pts)
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2
Copyright 2000-2005 Agilent Technologies

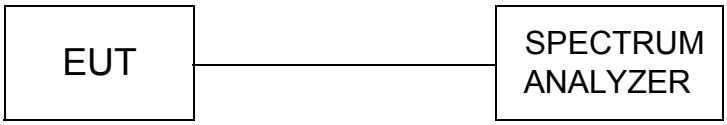

Agilent
T
Trace
Ref 10 dBm
Atten 20 dB
#Peak
Log
10
dB/
LgAv
M1 S2
S3 FC
£(f):
FTun
Swp
Start 2.422 00 GHz
#Res BW 300 kHz
#VBW 1 MHz
Stop 2.441 00 GHz
#Sweep 1 ms (601 pts)
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2
Copyright 2000-2005 Agilent Technologies


Agilent
T
Trace
Ref 10 dBm
Atten 20 dB
#Peak
Log
10
dB/
LgAv
M1 S2
S3 FC
£(f):
FTun
Swp
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2
Start 2.442 00 GHz
Stop 2.461 00 GHz
#Res BW 300 kHz
#VBW 1 MHz
#Sweep 1 ms (601 pts)
Copyright 2000-2005 Agilent Technologies


Agilent
T
Trace
Ref 10 dBm
Atten 20 dB
#Peak
Log
10
dB/
LgAv
M1 S2
S3 FC
£(f):
FTun
Swp
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2
Start 2.462 00 GHz
Stop 2.480 00 GHz
#Res BW 300 kHz
#VBW 1 MHz
#Sweep 1 ms (601 pts)
Copyright 2000-2005 Agilent Technologies

4.8. Dwell Time

TEST CONFIGURATION



TEST PROCEDURE

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. Place the EUT on the table and set it in transmitting mode.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set the spectrum analyzer as RBW =1 MHz , VBW =3 MHz. Span=0Hz,
5. Set center frequency of spectrum analyzer = operating frequency.
6. Set center frequency of spectrum analyzer = operating frequency.

LIMIT

A period time = 0.4 (ms) * 79 = 31.6 (s)

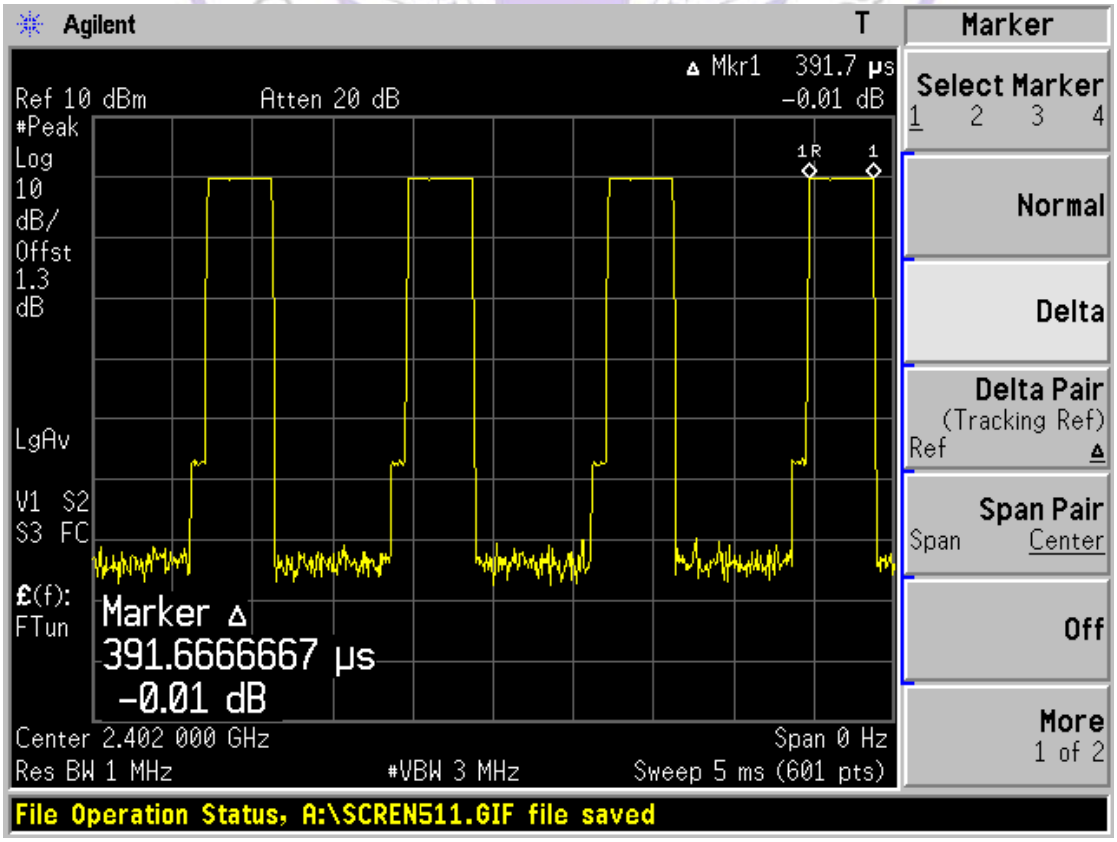
CH Low: Dwell time = 0.392 (ms) * (1600/ (2*79))*31.6 = 125.44 (ms)

CH Mid: Dwell time = 0.383 (ms) * (1600/ (2*79))*31.6 = 122.56 (ms)

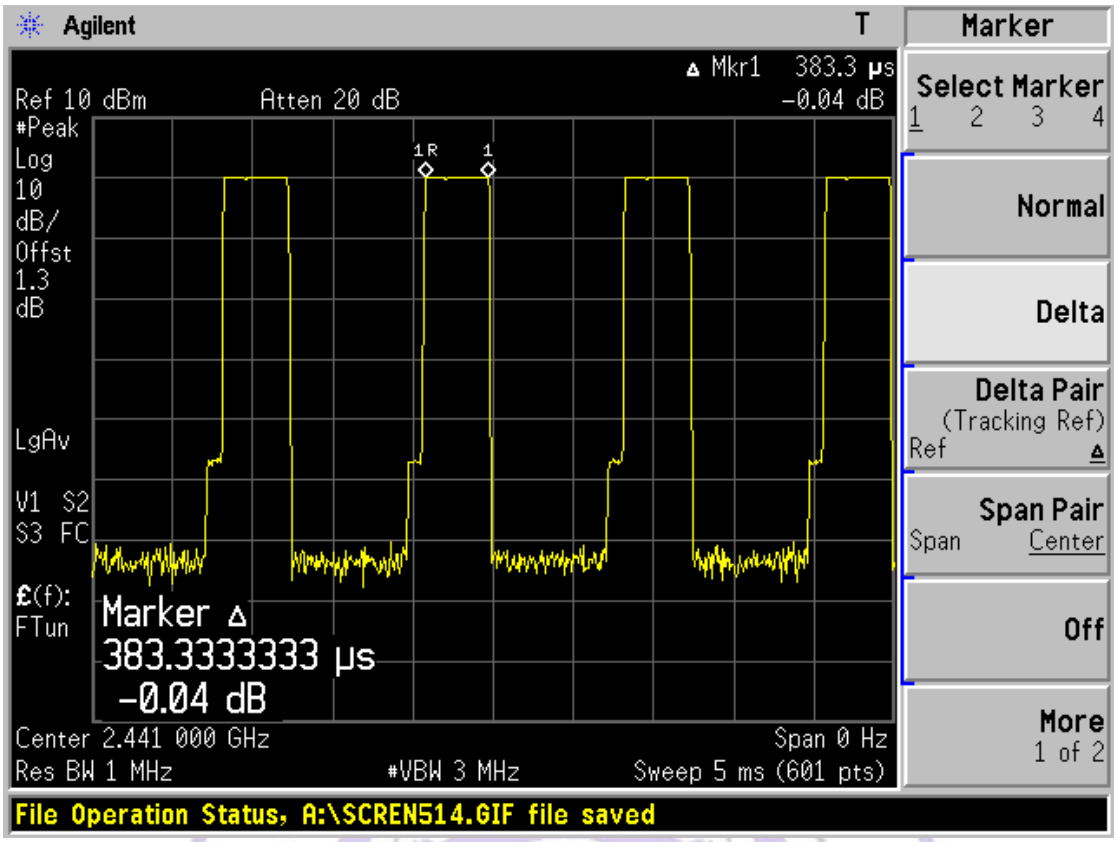
CH High: Dwell time = 0.383 (ms) * (1600/ (2*79))*31.6 = 122.56 (ms)

TEST RESULTS

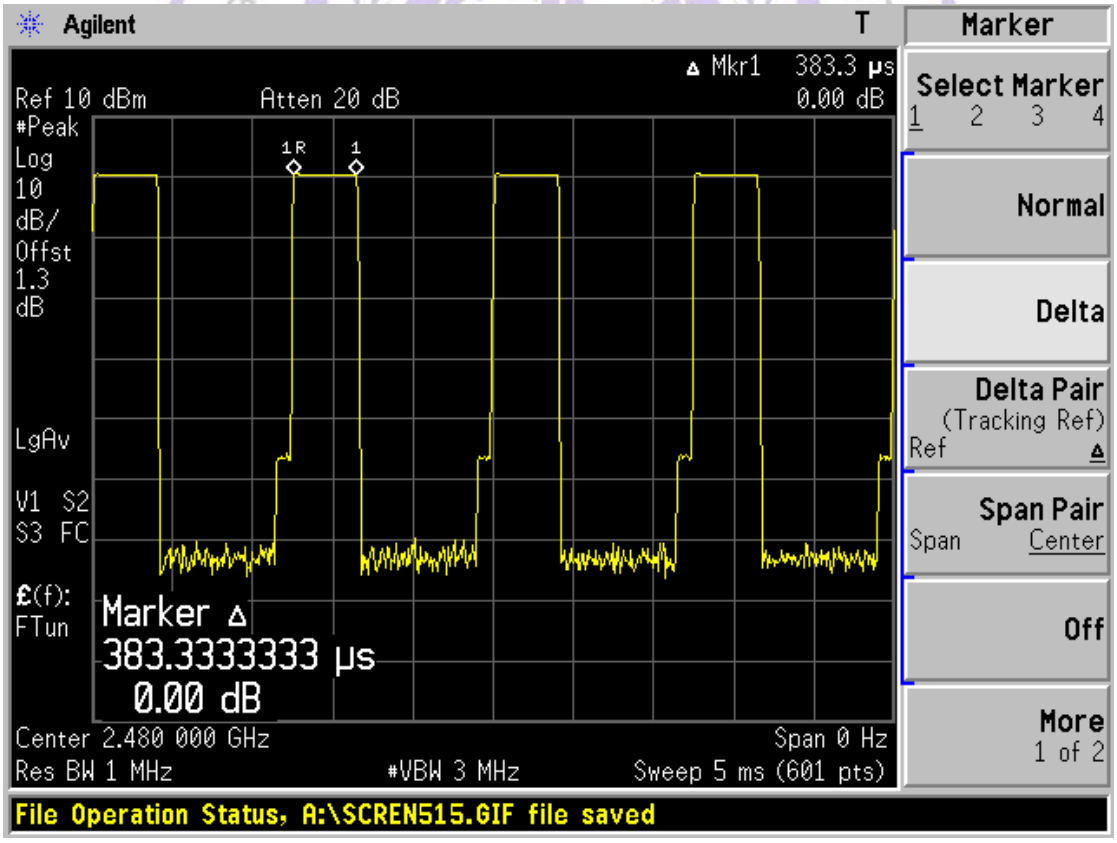
Dwell Time Test Data
CH-Low



CH-Mid



CH-High



4.9. Antenna Requirement

STANDARD APPLICABLE

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

And according to § 15247 (4)(1), system operation in the 2400-2483.5 MHz bands that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

ANTENNA CONNECTED CONSTRUCTION

The directional gains of antenna used for transmitting is -1.45 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

4.10. RF Exposure

STANDARD APPLICABLE

According to §1.1307 (b)(1), system operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

This is a Portable device.

MEASUREMENT RESULTS

This is a portable device and the Max peak output power is 0.63dBm (1.156 mW) lower than low threshold 60/fGHz mW (24.48 mW), d＜2.5cm in general population category.

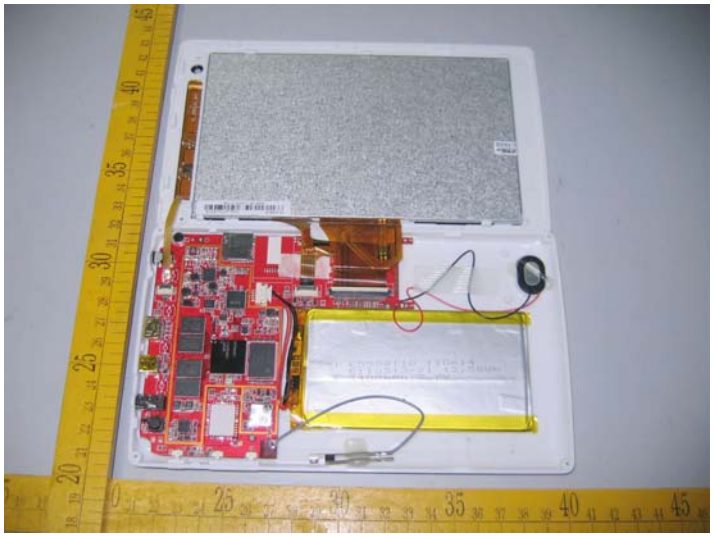
The SAR measurement is not necessary.

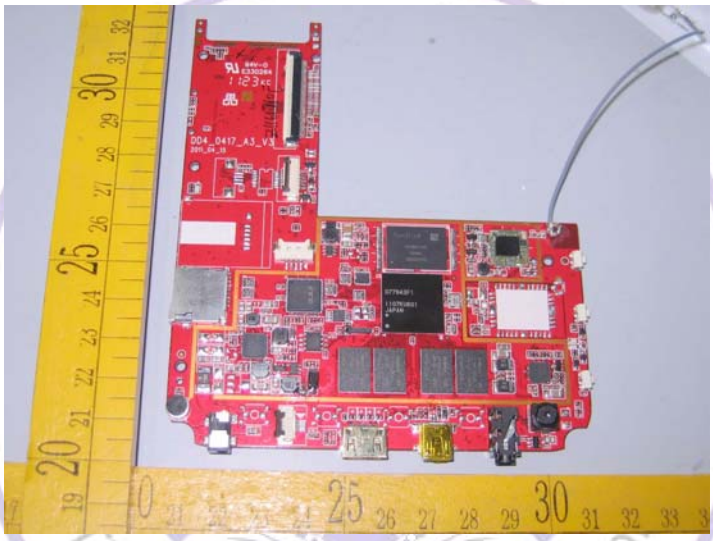
5. Test Setup Photos of the EUT

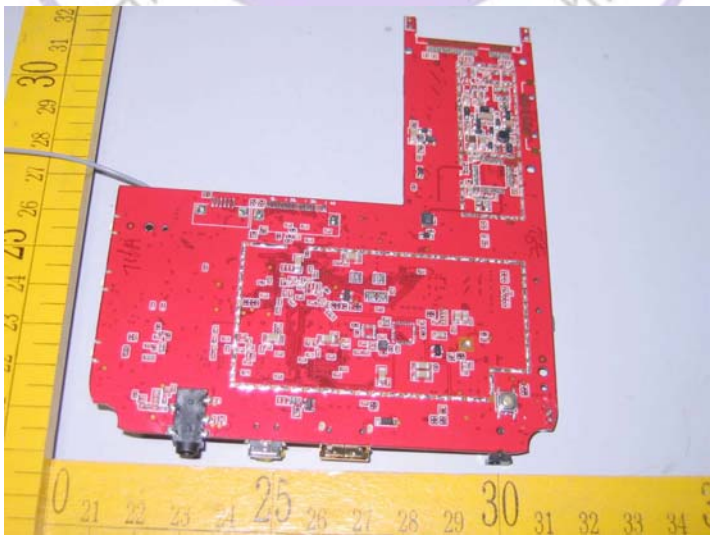
6. External and Internal Photos of the EUT

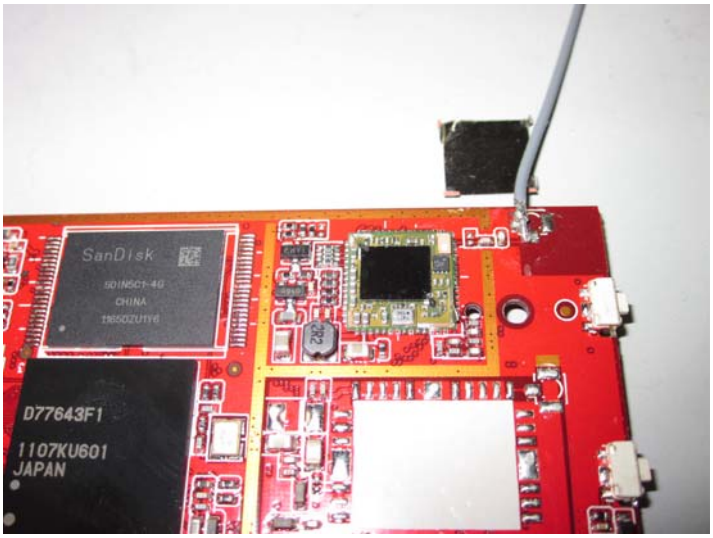
External Photos

Internal Photos









.....End of Report.....